

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

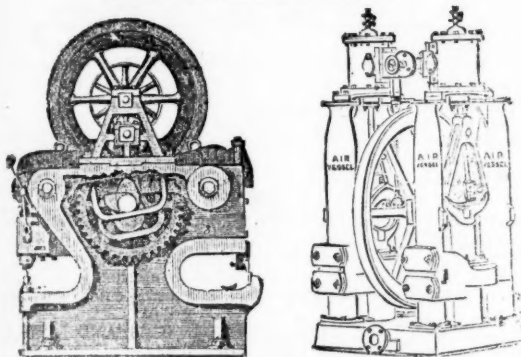
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No. 2231.—Vol. XLVIII.

LONDON, SATURDAY, MAY 25, 1878.

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PER ANNUM, BY POST, £1 4s.

JOHN CAMERON'S
SPECIALITIES ARE ALL SIZES OF
**Steam Pumps, Shipbuilders' Tools,
BAR SHEARS.**
ESTABLISHED 1852.



**OLDFIELD ROAD IRON WORKS,
SALFORD, MANCHESTER.**

For Excellence
and Practical Success
of Engines



Represented by
Model exhibited by
this Firm.

HARVEY AND CO.
ENGINEERS AND GENERAL MERCHANTS,
HAYLE, CORNWALL,
LONDON OFFICE,—186, GRESHAM HOUSE, E.C.

MANUFACTURERS OF
PUMPING and other LAND ENGINES and MARINE STEAM ENGINES
of the largest and most approved kinds in use, SUGAR MACHINERY,
MILLWORK, MINING MACHINERY, AND MACHINERY IN GENERAL.
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HUSBAND'S PATENT PNEUMATIC STAMPS.

SECONDHAND MINING MACHINERY FOR SALE.
IN GOOD CONDITION, AT MODERATE PRICES—viz.,

PUMPING ENGINES; WINDING ENGINES; STAMPING ENGINES;
STEAM CAPSTANS; ORE CRUSHERS; BOILERS and PITWORK of
various sizes and descriptions; and all kinds of MATERIALS required for
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Alloy, No. II., for pinions, ornamental castings, steam fittings, &c.	£120 per ton
" No. IV., for pinions, pumps, valves, linings, cylinders, &c.	130 "
" No. VI. (must be cast in chill) for bolts, &c.	140 "
" This alloy has very great tensile strength	
" No. VII., for hydraulic pumps, valves, and plungers, piston rings, bushes and bearings, for steel shafts	140 "
" No. XI., special phosphor-bronze bearing metal, wearing five times as long as gun metal	112 "

The prices of castings vary according to the pattern, the quantity required, and the alloy used.

WIRE ROPES, TUBES OF ALL DESCRIPTIONS, &c.

STANDARD LUBRICATING OILS
COMPANY, LIMITED.

DARK and PALE OILS for MACHINERY, RAILWAY, and MINING
PURPOSES, from TWO SHILLINGS per gallon, and upwards.

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ALEX. CHAPLIN AND CO.,
CRANSTONHILL ENGINE WORKS, GLASGOW.
PATENTERS AND SOLE MANUFACTURERS OF
CHAPLINS' PATENT STEAM CRANES, HOISTS,
LOCOMOTIVES, AND OTHER ENGINES AND BOILERS.

LONDON HOUSE:—
MCKENDRICK, BALL, AND CO.,



PARIS,
BRONZE MEDAL, 1875.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH,
SILVER MEDAL, 1867.

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKean Drill alone as the MODEL BORING MACHINE
for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive
weeks, ending February 7, was 24'90, 27'60, 24'80, 26'10,
28'30, 27'10, 28'40, 28'70 metres. Total advance of south heading
during January was 121'30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tunnel,
the McKean Rock Drill continued to work until the pressure
was reduced to one-half atmosphere (7½ lbs.), showing
almost the entire motive force to be available for the blow
against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these
Machines for the SEVERN TUNNEL; the LONDON AND
NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL; and the BRITISH GOVERNMENT for several Public
Works. A considerable number of Mining Companies are now
using them. Shafts and Galleries are driven at from three to
six times the speed of hand labour, according to the size and
number of machines employed, and with important saving in
cost. The ratio of advantage over hand labour is greatest
where the rock is hardest.

These Machines possess many advantages, which give them
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL
USE THROUGHOUT THE WORLD FOR MINING, TUN-
NELLING, QUARRYING, AND SUB-MARINE BORING.

The MCKEAN ROCK DRILLS are the most powerful—the
most portable—the most durable—the most compact—of the
best mechanical device. They contain the fewest parts—have
no weak parts—act without SHOCK upon any of the operating
parts—work with a lower pressure than any other Rock
Drill—may be worked at a higher pressure than any other
—may be run with safety to FIFTEEN HUNDRED STROKES
PER MINUTE—do not require a mechanic to work them—are
the smallest, shortest, and lightest of all machines—will give
the longest feed without change of tool—work with long or
short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or
open work. Their working parts are best protected against
grit and accidents. The various methods of mounting them
are the most efficient.

N.B.—Correspondents should state particulars as to
character of work in hand in writing us for information,
on receipt of which a special definite answer, with
reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,
IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

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ENGINEERS.

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MESSRS. P. AND W. MACLELLAN, "CLUTHA IRONWORKS,"

SMITH & FORREST,
OIL REFINERS,
ROSIN OIL DISTILLERS,
GREASE AND VARNISH MANUFACTURERS,
HOLT TOWN.
MANCHESTER.

Price List on application.

[ESTABLISHED TEN YEARS.]

DUNN'S ROCK DRILL,
AND
AIR COMPRESSORS.

FOR DRIVING BED ROCK
TUNNELS, SINKING
SHAFTS, AND PERFORMING
OPEN FIELD OPERATIONS,

IS THE

CHEAPEST, SIMPLEST,
STRONGEST, & MOST EFFECTIVE
DRILL IN THE WORLD.

Dunn's Patent Rock Drill Company

(LIMITED).

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THE
PATENT SELF-ACTING MINERAL
DRESSING MACHINE COMPANY

(LIMITED).

T. CURRIE GREGORY, C.E., F.G.S.

OFFICES,—GLASGOW: 4, WEST REGENT STREET.
LONDON: 52, QUEEN VICTORIA STREET, E. C.

IMPORTANT NOTICE TO MINE PROPRIETORS.

MR. GEORGE GREEN, ENGINEER, ABERYSTWITH,
SUPPLIES MACHINES under the above Company's Patents for
DRESSING all METALLIC ORES. Dressing-floors having these Machines possess
the following advantages:—

- 1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.
- 2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED BY DRESSING-FLOORS IS REQUIRED.
- 3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.
- 4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines, Darlington, Colberry, Nanthead, and Bollyhope; the Stoncroft and Greyside Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Darren, Escair-mwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines, Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Bratsberg Copper Mines, Norway, and Mines in Italy, Germany, United States of America, and Australia, from all of whom certificates of the complete efficiency of the system can be had.

WASTE HEAPS, consisting of refuse chads and skimpings of a former washing, containing a mixture of lead, blende, and sulphur, DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly profit on our Nanthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, if it had been wholly engaged in dressing wastes our returns would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines, says—"Your machinery saves fully one-half on old wages, and vastly more on the wages we have now to pay. Over and above the saving in cost is the saving in ore, which is a much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Pervith, say—"The separation which they make is complete."

Mr. MONTAGUE BEALE says—"It will separate ore, however close the mechanical mixture, in such a way as no other machines can do."

Mr. C. DODSWORTH says—"It is the very best for the purpose, and will do for any kind of metallic ores—the very thing so long needed for dressing-floors."

Drawings, specifications, and estimates will be forwarded on application to—

HOT-AIR ENGINES

Suitable for Pumping Purposes.



SEVERAL
Silver and Gold
Medals
HAVE BEEN AWARDED.

Cost of fuel, 2s. 6d. per week
per 1-horse power.

RE 1/2-H.P. HOT-AIR ENGINE—
PUMPING.
Royal Baths, Southend, March 14th,
1877.
Messrs. Hayward Tyler and Co.,
London.

Dear Sirs,—I am very glad to in-
form you that the Rider Patent Hot-
Air Engine, supplied by you for
pumping salt water for the warm
baths, does its work remarkably well.
The working of it is very simple, and
consumption of fuel very small.
Yours, &c., &c., T. W. INGRAM.

RE 1-H.P. HOT-AIR ENGINES, DRIV-
ING LATHES AND PUMPING.
Well Meadow Steel Works, Sheffield,
August 17th, 1877.
Messrs. Hayward Tyler and Co.,
London.

Gentlemen,—The 1-h.p. Patent Hot
Air Engine (for power) supplied is
driving two small lathes and a small
planing machine and giving satisfac-
tion. It was set to work by a man
who had never seen one before, and
without any instructions to guide
him. The 1-h.p. Hot-Air Engine, for
pumping, has been put down at a
railway station to raise water from a
well to supply an engine tank. The
engineer is well pleased with it, and
intends having several others for the
same purpose on the line.

We are, Gentlemen, yours truly,
(Signed) EDGAR ALLEN & Co.

RE 1/2-H.P. HOT-AIR ENGINE—
PUMPING.
The Elms, Hereford, June 4, 1877.
Messrs. Hayward Tyler and Co.,
London.

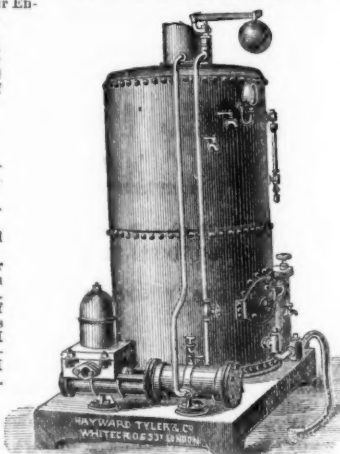
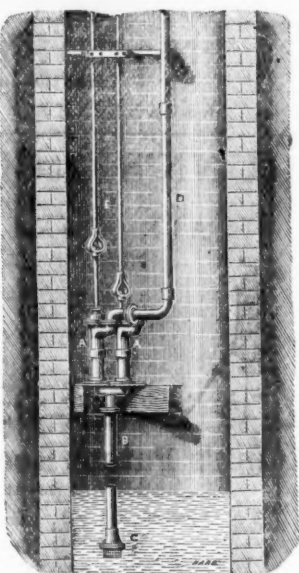
Gentlemen,—It gives me much
pleasure to state that the Hot-Air En-
gine supplied by you to me
affords me entire satisfaction.
It works well and easily, and
the entire water supply of my
house is pumped up several
hundred yards by means of
this Hot-Air Engine.

Faithfully yours,
(Signed) CHAS. ANTHONY.

RE 1-H.P. HOT-AIR ENGINE—
PUMPING AND DRIVING MA-
CHINERY.
Robin Hood, Hall Green, Wor-
cestershire, June 4th, 1877.
Messrs. Hodgkin, Neuhaus, and
Co., London.

Gentlemen,—The 1-h.p. Rider
Hot-Air Engine supplied by you
to me gives every satisfaction.
It pumps water to the top of
the house, cuts the chaff, crushes
the oats, splits the beans, &c. I
shall be very happy to recom-
mend it to anyone—in fact, I
have already done so to several.

Yours truly,
(Signed) SAMUEL WALKER,
per S. S. WALKER.



"Universal" Steam Pump on Boiler.

Hayward Tyler & Co., London.

PATENT DUPLEX LAMPS

FOR COLLIERIES, IRONWORKS, &c.

SUITABLE FOR PIT BANKS, ENGINE HOUSES, &c., &c.



Each Lamp gives a light equal to
26 candles.

No breakage of Chimneys from
heat.

Cottons last three months.
Will burn any mineral oil.

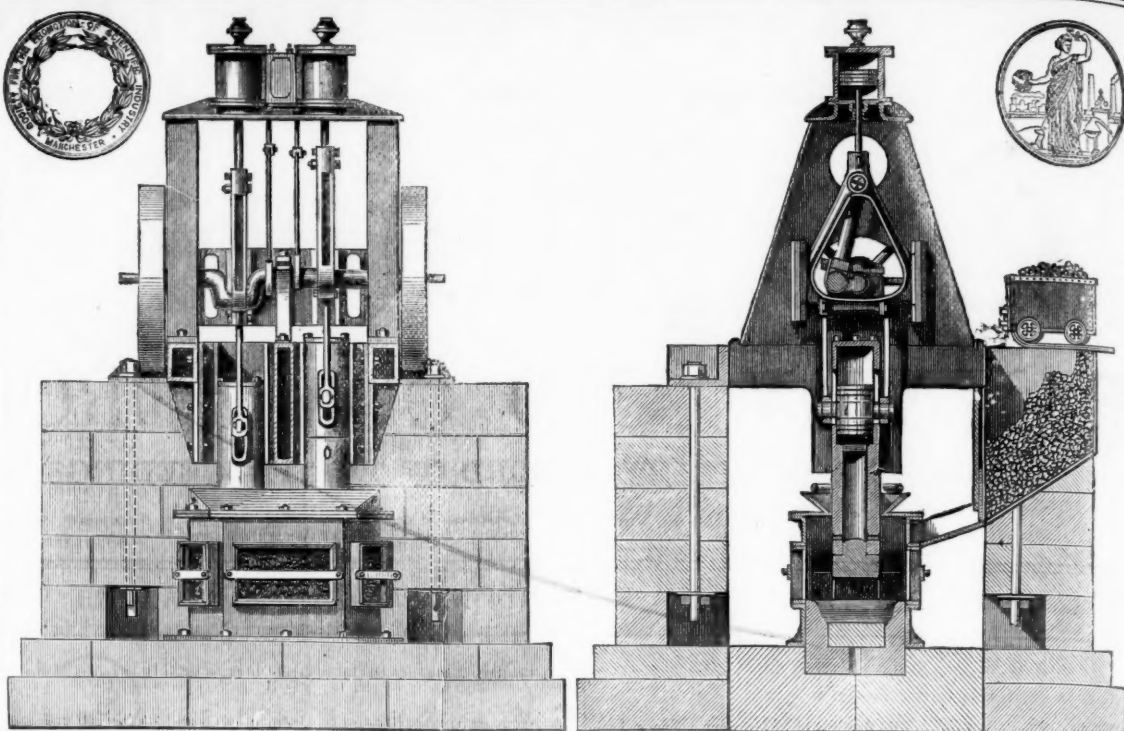
S. HOOPER,
LAMP MAKER & OIL MERCHANT,
LOWER TEMPLE STREET,
BIRMINGHAM.

N.B.—Lamps made suitable for every
purpose.

THE BEST SIGNAL BELL MADE FOR
MINING PURPOSES.
ILLUSTRATIONS ON APPLICATION.

THACKRAH'S DAILY SHARE-LIST, issued EVERY EVENING
from THACKRAH'S SHARE AGENCY, 20, NORTHGATE, HALIFAX, gives
current prices of Shares in—John Crossley and Sons (Limited), Carpet Manufac-
turers, Halifax; H. Briggs, Son, and Co. (Limited), Whitwood Collieries, Nor-
manton; Norton Brothers and Co. (Limited), near Huddersfield; M. Oldroyd
and Sons (Limited), Dewsbury; Bolekew, Vaughan, and Co. (Limited); New
Sharistown Collieries Company (Limited); Yorkshire Boiler Insurance Company
(Limited); the Goole Steam Shipping Company (Limited); and more than 250
other companies.

Persons may ensure the regular delivery to them, through the post, of this List
for the following yearly payments, inclusive of postage:—Once a month, 2s. 6d.;
twice a month, 5s.; once a week, 10s.; twice a week, 21s.; daily, 25s.



SHOLL'S PATENT DIRECT-ACTING PNEUMATIC STAMPERS,

For Pulverising Tin and Lead Ores, Gold Quartz, &c.,

SOLE MAKERS FOR CORNWALL,

N. HOLMAN AND SONS,

ST. JUST FOUNDRY, NEAR PENZANCE, CORNWALL.

All objectionable features of "wear and tear" common to the original and existing Pneumatic Stamps (driven by belts) are removed in this patent, and leather glands and stuffing boxes entirely dispensed with, the pneumatic piston being reciprocated into the compressing chambers by direct-action from without. These double machines are guaranteed to be of the capacity of 30 ordinary heads of cam and lifter stamps, and engineers will at once see that, inasmuch as the power is directly applied to its work (without the medium of belts and other gearing), the minimum consumption of coal (all other conditions being equal) must be the result.

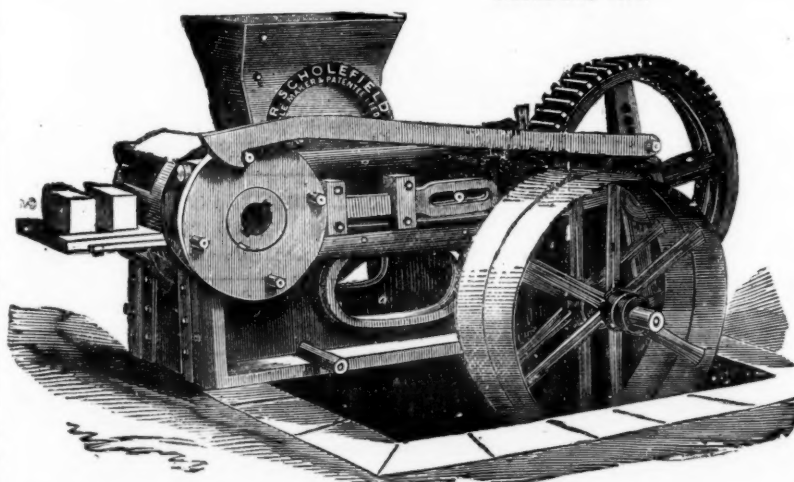
The COST OF THESE MACHINES (including boiler) is about ONE-THIRD OF THE ORIGINAL CAM AND LIFTER STAMPS, to do the same work.

ROTARY STAMPERS SUPPLIED ON THE SAME PRINCIPLE, WITHOUT STUFFING BOXES OR GLANDS, WHERE RUNNING GEAR EXISTS, OR WITH HORIZONTAL CONDENSING ENGINES AND BELTS TO DRIVE THEM, IF PREFERRED.

Also, SOLE MAKERS OF STEPHENS' PATENT PULVERISER.
MINING AND OTHER MACHINERY CONSTANTLY ON SALE,
NEW AND SECOND-HAND.

R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



R. S. begs to call the attention of
all Colliery Owners in particular to
his PATENT SEMI-DRY BRICK
MACHINE, and the economical meth-
od of making bricks by his patent
machinery from the refuse that is
taken from the pits during the pro-
cess of coal-getting, which, instead
of storing at the pit's mouth (and
making acres of valuable land use-
less) is at once made into bricks
at a very small cost, by R. S.'s Pa-
tent Brick-making Machinery. If
the material is got from the pit hill,
the following is about the cost of

production, and the lands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	8 0
1 man grinding, 4s. 6d. per day	0 4 6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0 2 0
1 boy greasing, 1s. 6d. per day	0 1 6
1 engine-man, 5s. per day	0 5 0
1 man wheeling bricks from machine to kiln, 4s. per day	0 4 0

Total cost of making 10,000 pressed bricks ... £1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.
SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS.
KIRKSTAL ROAD, LEEDS.

British and Foreign Safety Fuse Company,

REDRUTH, CORNWALL,

MANUFACTURERS OF

SAFETY FUSE,

FOR MINING AND QUARRYING PURPOSES.



PRICES ON APPLICATION.

Original Correspondence.

THE TIN MINES OF TASMANIA.

SIR,—For Mr. F. D. Wickham's courteousness in sending me the report of the Mount Bischoff Mine and meeting I thank him much. I do not know that jealousy forms any part of our feelings here with regard to Tasmania as a tin-producing country; neither can there be any incredulity or suspicion of what has been so forcibly demonstrated. Yet when a gentleman expects us to receive such accounts as Mr. Wickham has recently extracted for us from the Launceston Examiner he may find that he had relied on too great an amount of gullibility to be found in this Western Peninsula. If Mr. Wickham has read any portion of my former letter as intimating that he had any sinister design in writing in the manner he has written I am sorry, not having intended to have so intimated. Mr. Wickham's proclaimed interests and objects are quite sufficient to give a bias to most minds, and to keep them looking at things from their own standpoint. Let us look at what those interests and objects are. First, Mr. Wickham is interested in the tin-plate trade. Now, who are more interested in securing a constant low price for tin than tin-plate workers? I believe it is a well-known fact that a low price for tin enables tin-plate workers to work their trade much more advantageously to themselves than a higher price; and, however low is the price, they are ever ready to believe it should be put lower still. Then Mr. Wickham is expressly interested in getting more labourers in Tasmania, the direct result of which will be to put down the price of manual labour there. These would be sufficient incentives to most men in a similar position to put things as strongly as possible—hence it would be supererogatory on my part to intimate sinister designs.

Mr. Wickham alludes to the possibility of the manner in which we receive a little information affording him some amusement. Well, here is a gentleman interested in the mine at the Antipodes which in four and a-half years has produced 3433 tons 15 cwt. 2 qrs. 8 lbs. of tin ore, and he thinks that is going to set up all Cornish tin mines, which are producing about 60,000 tons during the same period. Surely it looks not at all unlike the frog in the fable; and if Mount Bischoff does not burst up before attaining these proportions the extinct volcano will remain quiescent for some years or probably for generations yet. The excessive production of Cornwall has even now done more to keep the price of tin down than Mount Bischoff has done, and they way some people are opening tin ground by rock-drills in this country may keep the price down longer yet. Were it not for the fact that no course of metallic ore ever has been or ever can be continuous this alone would militate against a return to high prices; but we know that the quicker you open up so much the quicker you dig out all metallic mines. Hence this rapid working may work its own cure; but that cure would be a result very different to Mount Bischoff driving into "a point obliging us to close all our works." Should Mr. Wickham by any possibility succeed in what it appears he thinks he has a chance of doing, frightening all Cornish mine proprietors and closing all Cornish mines, where would he turn for the annual 12,000 or 13,000 tons of tin which would then be lost out of the market? It is pretty clear that Mount Bischoff could not supply it. We have one single Cornish mine which has produced a much larger quantity of tin in the same time than even Mount Bischoff has done, and has paid much more in dividends while doing it. We have other Cornish mines which will pay at a price at which all the Tasmanian mines would have to shut up or be worked at a loss. Does Mr. Wickham see anything amusing in that? True, some Cornish mines may have to shut up too; but even that will make it all the better for the others, for it is likely that mines on regular veins in the permanent rocks must be more continuous than any alluvial deposits; and after these alluvial deposits are run out what then? It is not so long ago that the alluvial deposits in Queensland were going to shut us all up. Where are they now? I have been connected with Cornish mines for more than 40 years, and during that time Cornish mining has been threatened many times from within and from without; but we have not closed "all our works" yet, and are not more likely to do so now than has been the case many times before. It is rather more likely that before then we shall see Tasmanian alluvial deposits following those of Queensland in being reckoned among the glories of the past, and this I think the most certain conclusion, judging from all authoritative reports on the matter from men who understand mineral formations.

It is rather amusing to witness with what ideas of permanency amateur miners persist in regarding their every discovery. Banca was going to supply the world forever, and she has supplied tin for a long while, but not sufficient to prevent the price rising more than once to a very high point. Spain, with a few sacks of tin scattered over a large surface was going to swamp all our markets. One American State, I think Minnesota, had a hill of tin which turned out to be Titanic iron. I never knew that Mr. Wellington, from Cornwall, reported Tasmania to produce "only titaniferous ore, and of no value." As near I can remember it was from the Wellington that we in Cornwall received the first account of Tasmanian tin as likely to come in large quantities into our markets. We have been threatened to be inundated with tin from almost every country on the face of our earth, and now one of our professors has found tin in large quantities in the sun. If, as it appears has been conclusively proved, we have been receiving colossal matter through countless billions of ages, it is no wonder that we find tin scattered here and there. I was told about 10 years ago by an amateur tin miner that they had found on the coast of China a beach, broad in extent, of great depth, and 200 miles long, nearly all tin, mixed with a little sand; and that he and his friends were sending 500 machines to blow the sand off the tin, which required no other cleaning to be ready for the smelter. As this gentleman laid out a large lot of money afterwards trying to find a tin mine in Cornwall I suppose that the ship, with the 500 machines, has not yet arrived at its destination.

Wherever a mineral discovery is made those more immediately interested generally find a number of reasons for proclaiming its permanency. Queensland could not reach the summit of their supply of tin for hundreds of years, and yet the summit has been already passed. It appears to be the same in all branches of mining—witness the efforts being made by the new American School of Mining Experts to prove that the productive veins on the Pacific slope penetrate into the deepest recesses of the earth, and must increase in richness as they descend. These men either do not know or they ignore the fact that metallic minerals can only grow in rocks which are suitable to their production. I have seen a report published of these mines trying to show that they must continue for two millions of years, and be profitably worked all that time.

But, turning to Tasmanian tin mines, which Mr. Wickham thinks are going to continue long enough to compel Cornish tin miners "to close all their works." We have Capt. John Mufford reporting—"The tin is found in the flats, creeks, gullies, and river beds in patches of a very variable character. A number of these deposits are close to the surface, and have been rapidly worked out." And, coming to Mount Bischoff, that gentleman remarks of the Stanhope Company—"This company have worked up the richest part of their deposit, and the late bottom is laid bare all up the side of the said basin to the ridge." Mr. Kayser, the manager of the Mount Bischoff Company's Mines, in his report to the directors on Dec. 31, 1877, referring to one part of their works, the Slaughter-yard Gully, says—"As much alteration has taken place at these workings as anywhere on the mine; but I am sorry to say that I cannot report an improvement, as the bottom is rising on all sides;" and further on he says—"I am still in hopes of meeting with some good vein tin before long." These remarks are sufficient to show the nature of the mining there, and the worthy manager's "hopes of meeting good vein tin before long" may satisfy Mr. Wickham that they "have permanent lodes;" but until they have something more than hope of this it is too much for him to expect Cornish tin miners "to close all their works," and to emigrate in a body to Tasmania.

Because we do not believe that Mount Bischoff Mine, with its 3433 tons of tin raised in four and a-half years from an alluvial deposit which is being rapidly worked out, can outlast and totally

destroy a Cornish industry of about twenty times its magnitude. Mr. Wickham accuses us of resisting the truth, and of trying to hoodwink the miners. What is the truth we are said to resist? I have never heard anyone express any doubt of Tasmania producing large quantities of tin, but all practical authorities are agreed that there have not as yet any veins of tin been found there worth working. What is the truth then Mr. Wickham refers to? Mr. Wickham also hints at some persons trying to "hoodwink the miners." Now, this is simply ludicrous, and shows a total ignorance not only of Cornish miners, but of their relations with or positions in regard to the mines. There are few Cornish miners but have friends and acquaintances in all the foreign mining districts, and through them get some knowledge of the mines there and of their prospects. Let Mr. Wickham try his hand at hoodwinking these men, and say what he thinks of them after he has tried. But who would be interested in hoodwinking the miners? Would it be the men who are drawing upon their private resources to keep the mines going through the depressed times to keep the miners employed? Would it be those who have mines that can pay profits through the depressed times, and what would be their object in seeking to hoodwink? We have at all times a sufficient number of good miners in this country for all our works, and can at any time by a few months practical teaching manufacture any number required. We are, therefore, glad to find that they have other mineral districts to which to emigrate—although we, rather they, find any other metal than tin; but when they do find it we know very well that we have to do our best to get through in the face of that. Mr. Wickham thinks we ought to shut up our mines, and the parishes should pay the passages of the men to Tasmania. Now, as the mines in this country are the greatest ratepayers it would be more fair I think for Tasmania to pay the passages of the men, especially as their express object in getting so many there is to lower the rate of wages in Tasmania. But who are seeking to hoodwink, and who are those supposed to be subjected to that process? Is it contrary to the interests of the miners resident in this country that the mines are kept at work which give them employment? What would be the immediate result of our following the advice of Mr. Wickham? Many thousands of men, women, and boys would be immediately thrown out of employment; and this is a result Mr. Wickham appears to contemplate with equanimity. Could they all emigrate to Tasmania; and if they could it is worth while to cause all this misery and starvation in order that a few people in Tasmania shall get cheaper labour to work their trumpery tin streams at a profit? I say trumpery tin streams advisedly. Did not Sir James Wilson prove this when he became the spokesman of the deputation to the Ministry, showing that seven companies in six months produced 15,534 lb. worth of tin at an expenditure of 15,572 lb., and asking the Government to do something for them to enable them to pay cost? Did not Mr. John Mufford show the trumpery nature of these so-called mines when he showed that 47 of them produced a total of 157 tons of tin ore in six months, or an average of 11 cwt. of tin ore each mine per month?

I think enough has been written to show the jaundiced nature of Mr. Wickham's mind when he penned his remarks. Before he writes again on this subject perhaps he will study more the constitution of Cornish mines and the relation of the miners thereto, and having done so he will know better than to accuse anyone of endeavouring to hoodwink the miners. I think also that he had better post himself up as to the true nature and prospects of Mount Bischoff before expecting us to believe they have veins or paying reefs there on no other evidence than the hopes of the manager "of meeting with some good vein tin before long." Many have "hoped" the same here and in other countries too without having had the luck to find it.—Redruth, May 17.

W. TREGAY.

AMERICANS EXTENDING THEIR MINING OPERATIONS OUTSIDE OF THEIR COUNTRY.

SIR,—A short time since I forwarded you a San Francisco Evening Post, with a description of the mining operations carried on by Americans on the west coast of Mexico; how they had established a foundry and machine shop in Mazatlan-street; tramways, and the construction of a railway to the mines; and the building in Mazatlan of the first steam-engine on Mexican territory by Americans. This engine was made for a mining establishment upcountry. We now hear of General Rosencranz, former Minister to Mexico, being deputed to inspect the recently discovered anthracite coal beds somewhere near Guaymas. These are considered very extensive, and San Franciscans believe they can supply all their wants from the Mexican coal mines. You are aware that California has no coal mines to speak of. In Chile, an American company with \$10,000,000 nominal capital are carrying out extensive gold hydraulic operations; the latest is the enormous silver quartz mill for Peru.

AN ENORMOUS MILL FOR A PERUVIAN SILVER MINE.—Rankin, Brayton, and Co., of the Pacific Ironworks, have recently entered into a contract with Wm. H. Cilley for the construction of an 80-stamp silver mill of the most improved design for the celebrated Cerro de Pasco Mines of Peru. Mr. Cilley was a partner with the late Harry Melgus in most of his gigantic railroad operations in South America, and he and his associates are now completing the contracts entered into with the Peruvian Government before Mr. Melgus' death, among which was the construction of the Arroyo Railroad, and the development and operation of the mines above referred to. This road runs from Lima over the summit of the Andes, and is to connect with the fertile valleys of the eastern slope. It is now completed some 80 miles from Lima, leaving about 70 miles more to build to bring it to the above-named mines. This enormous mill, with one exception the largest ever built, will weigh up some 800 tons, and a vessel will be chartered to carry it to the port of destination. As the machinery has to be packed on mules over the uncompleted portion of the road, it will be made in sections, no piece exceeding 300 lbs. in weight.

The Cerro de Pasco Mines have been the richest and most famous in the world's history, having produced according to the Government records previous to the year 1826 the enormous sum of \$492,000,000, and were only worked to the depth of 200 ft. They are located in the heart of the Andes at an elevation of 14,000 ft. and some 150 miles east of the city of Lima, and are fully described in Humboldt's History of New Spain, published in the early part of the present century.

Meanwhile John Bull is grumbling over his mining blunders in the United States, and the Yankees are extending their mining operations considerably over various portions of the world.

Pine-street, San Francisco. HENRY SEWELL, M.E., F.R.G.S.

DON PEDRO MINE.

SIR,—In reply to Mr. Houston's letter, in the Journal of May 11, I beg to say that I am neither "bull" nor "bear" of any shares, but one who from dearly bought experience has learned caution, which I desire to impart to investors, who are often credulous, and tempted by *couleur de rose* counsels to risk the savings of their life-long industry. The justifications of my warnings have been prompt and manifold.

I dislike paper warfare, but in furtherance of my original design I hope you will allow me space for a few lines to recapitulate the proofs which I have to adduce in support of my advice. Swift has been the confirmation given by a "Constant Reader," who evidently knows the mine better than I (a merely distant observer) do, and I need add nothing to his emphatic observations. Next in order are Mr. Houston's own letters in the Journal of May 4 and 11, and I submit that by these he is condemned out of his own mouth. He admits that his statements are exaggerated, for he says plainly "In these times a little *couleur de rose* is indispensable to attract attention." It is not, however, that he takes a mere optimistic view, but he proceeds to draw conclusions which the facts do not warrant. Then follows the rise in the price of the Don Pedro shares, which appears to me to be unreasonable. The cardinal point to be considered is that of loss or profit on the working of the mine; if the latter then the shares are valuable, if the former they are comparatively worthless, except you can show strong evidence of a near approach to an improvement in the mine. Mr. Houston himself supports my statement that the yield for March of 4500 oitavas results in a loss, and I fear a considerable loss. And what of April? It is a curious, and for Mr. Houston an unhappy, coincidence that the accounts for the month of April appear in the same Journal with Mr. Houston's last letter, as the accounts for March did with his first letter; and he is forced to confess, what no one could dare deny, that the yield of March is insufficient to meet the cost. We shall see in due time, in regard to April, how far his *couleur de rose* vaticinations for the purpose of attracting attention are justified. Far be it from me to question the ability of Capt. Vivian as a practical miner, but there does remain with those who held Argentine

Mine shares a poignant recollection of his reports in that case, and the unfortunate necessity of his return, leaving a sick mine to die in liquidation and ruin.

This brings me to my principal point—is there a progressive profit shown from Don Pedro, or even steady improvement capable of proof from the accounts of yield and expenditure? Again I ask, what of April? Profusion of captives work and detail, winding up with a produce of 3050 oits. If 4527 oits. (the exact produce for the month of March) gives an admitted loss, and I learn from those who know the province of Minas Geraes as miners that it would take from 6000 to 8000 oits. per month to pay cost and leave a small profit, certainly 3050 oits. on the same scale of working looks, I fear, very like a ruinous result. Having said all I deem necessary to warn the unwary, I shall not trouble you to continue a paper war, but leave "Constant Reader" to avert the influence of any unreasonable attempt to force the shares; and I can only say that in my judgment nothing in the returns as yet warrants the belief that the Don Pedro property will form an exception to what appears to be the rule with other auriferous "jacotings" formations—that only meagre shoots of ore are found below a comparatively high level.—May 20.

MENTOR.

NEW QUEBRADA COMPANY.

SIR,—I observe that in my letter, which appeared in last week's Journal, the total copper produce from an expenditure of 105,800 lb. in five years has been printed as 7382 lb., instead of 7318 lb. I am rather glad than otherwise that this mistake has occurred, as it has directed my attention again to the entries connected with this item in the accounts now before us, and the result is certainly disheartening beyond measure. The Bolivar Railway, which was commenced in May, 1873, was not completed till October, 1877. In 1876, as the shareholders of this company were growling at the delay and the enormous expenditure that was going on, a commencement was made of consignments of copper ore to our agents, Messrs. Matheson and Co., and the result of these consignments is that they have (according to the accounts) credited this company during the two years with a sum of 7318 lb. The several items composing this amount showed (as I fondly imagined last week) the balances left in the hands of Matheson and Co. to the credit of our company after paying all charges on the respective shipments, such as railway carriage to Tucacas, freight, insurance, &c. But, as against the above, I now observe in the accounts an item called "Transport of ores," amounting in all during the corresponding period to 7382 lb., which more than wipes out my fancied profits on shipments, so that, assuming the figures given in the accounts show the exact result of these shipments, the ores sent home have not even paid the carriage and sale expenses. But that is not the worst of it, for over and above the sum of 7382 lb. paid by our directors for the transport of the comparatively trifling quantities of ore that have come to hand, they have actually expended during the two years they were apparently labouring might and main to send home these cargoes the sum of 48,895 lb. Truly, never before did "parturient mountains bring forth such muscular abortions." The reason why I have contrasted our present position with our position in 1873 is that our present board was constituted in that year, and we were then led to believe that, with the Bolivar Railway arranged for, the millennial era of the company had at last dawned upon us. But, *coila!* And now, in conclusion, being but an unknown and humble shareholder, whose name can add nothing to the force of his observations, I subscribe myself, as before—

O. K.

London, May 20.

NEW QUEBRADA COMPANY.

SIR,—I can sympathise with your correspondent, "O. K.," having been in a similar position in another mining company, where inflated reports and calculations from picked specimens of ore had led to expectations of great results which were not realised in practice. Mr. Darlington was called in, and soon swept these cobwebs from our eyes, and told us the facts. Unwelcome as the truth was we acted on his advice, but here the similarity with the Quebrada shareholders' position ends. This company called in the same gentleman, and his report—made after a long personal investigation—was unpalatable; but who doubts its truth? His report stated that certain things must be done, and money found to do them, but "O. K." must know, as a shareholder, that few, if any, of his suggestions have been carried out—for want of money I believe. "O. K." is like an invalid who after consulting a physician, and not using the remedies ordered to cure him, abuses the doctor because at the end of twelve months he finds himself no better. Mr. Darlington's reports and the character of the ore sent home show plainly the character of the Quebrada lode—a large body of copper ore of good average quality, with rich bunches in places; but, as in mining, you must remove the poor to obtain the rich ore, calculations must be based on an average composition. One good result of Mr. Darlington's report has been the rearrangement of the railway contract, and if the ore is brought down to port at a moderate tariff there should yet be good times in store for the Quebrada Company, assuming that the money required to develop the mines (as stated in Mr. Darlington's report) is raised, and that internal dissension is avoided.

SCRUTATOR.

NEW QUEBRADA COMPANY.

SIR,—Mr. Symons's reply to the objection I raised in my last letter to his statements and figures as to smelting costs by the Castilian furnace at Maidenpek during 1877 is not I think very satisfactory. Mr. Symons now states that what he intended to convey was that the 38s. 6d. for reinstating the furnace was incurred each time it required repairs, and not that it was the cost for the whole year. This must have been patent to all practical men, but even now the figures are not consistent. Mr. Symons does not give the total quantity of ore smelted during the year, but taking the 126 campaigns he names, giving each an average duration of five weeks, and daily reduction of 5½ tons of ore, we arrive at 24,255 tons, and then taking the sum named in his first letter for reinstating—1s. 0½d. per ton of ore—we get the sum of 1288 lb. 10s. 10d. against his 242 lb. 7s. 11d., and the average cost each time of 10 lb. 4s. 6d. against 1 lb. 18s. 6d. Mr. Symons now states that a 20-ton heap of matte costs approximately five guineas. This quantity of 22 per cent. matte represents about 116 tons of 4½ per cent. ore, less the 0.35 per cent. metal in slags; this, therefore, does not correspond with the 8½d. originally stated. Mr. Symons does not notice the other exceptions named in my last letter. I think I have said enough without going further into details to show that Mr. Symons's figures are quite fallacious; they do not bear examination.

From Mr. Symons's description of the Maidenpek ores I cannot see why it was found disadvantageous to obtain matres richer than 22 per cent. At Mansfeld, where the cupreous schists only average 2½ per cent., it is found more economical to produce a regulus of 30 to 40 per cent. at the first fusion. The statements that "ores (sulphurets) containing over 30 per cent., and even quartzose ores holding only 22 per cent. of sulphide, can be reduced to bars by simply roasting and running through the Castilian furnace," and that "matres of 20 to 22 per cent. roasted and simply fused once are run into bars of 95 to 98½ per cent. of copper," need no comment whatever. Mr. Symons is evidently at sea in metallurgy. How the Castilian furnace can compare favourably as to fuel and labour with the gas furnace named in my last letter, which will do more than double the work with half the number of men, burning only the same quantity of raw wood, and is represented by 1½ ton of charcoal required by the Castilian, and requiring no blast, is a problem I shall not attempt to solve. The cupola, named in my last letter, to reduce 50 tons of ore daily can no doubt be erected in Europe for less than the 315d. required to build nine Castilian furnaces to do the same work, and the outlay for buildings, blast-power, &c., would be considerably less. I would suggest to Mr. Symons before he further advocates this antiquated Castilian furnace to carefully study the really splendid system of smelting poor copper ores in the blast-furnace, with either charcoal or coke as fuel, in operation at Mansfeld. He will there find furnaces, smelting each 150 tons of only 2½ per cent. ores in the 24 hours, producing the rich matte I have named, the slags not containing over 0.15 per cent. of copper.

with fuel, labour, and all other charges reduced to a minimum. I feel satisfied he will quickly alter his views. CHAS. BOUNDY.
Smelting Works, Ripley, Derbyshire.

AN EXAMINATION INTO THE POSITION AND PROSPECTS OF CERTAIN MINES, No. VI.—SIERRA BUTTES.

SIR.—Attention to gold and silver mines has for some years past been of a limited character. At the present time mining for the precious metals offers unusual opportunities for mining capitalists. No class of mining, when success has been met with, is so remunerative as that of gold and silver. During 1877 the dividends of eight gold and silver mines—English companies—amounted to 185,000*l.*, whereas 31 English mines, being all the dividend companies, paid only 173,000*l.* The one thing, or rather the two things, which have militated against the profitability of mines producing the base metals—supply and demand—do not affect gold and silver mines. For a long time past tin, copper, and lead mining shares have been a drug on the market, because of the accumulation of their metals brought about by an unprecedented political and commercial crisis. But, although political circumstances have largely added to the great depression existing in the metal market, it is difficult to see how the vast supplies of base metals from all parts of the world are to be absorbed by ordinary commercial prosperity. The production of tin is no longer confined to Cornwall and the Dutch settlements, for Australia and Tasmania are able, so competent authorities inform us, to forward large stocks when prices advance. The quantity which has been shipped from those colonies within the past few years has been such as to cause serious alarm at home. Besides this, important discoveries of tin have been made in the Hartz Mountains. Copper abounds all the world over, and lead can now be raised in almost fabulous quantities both in Europe and in America. There are several interesting events which are likely to arouse public attention to the gold and silver mining question. The researches of Capt. Burton in Midian is one of these, and the importance of that country as a gold-producing country must necessarily grow as public attention is drawn to it, which it is sure to be, as companies will, undoubtedly, be formed to open up the hidden riches of that ancient land. Then there is a gold property owned by an European Government, which for dimensions and richness is said to be second to none in the world, also likely to come in the market shortly. I am not at liberty to name this. I have already in these letters noticed two mines which produce silver—Richmond and Eberhardt; the first of these also produces gold in large quantities. The mine now before our notice (Sierra Buttes) is, perhaps, not very widely known, beyond those who have special interest in it. The proprietary, a very respectable one, has been content to hold its own, being satisfied with the 10 per cent. dividend annually received for eight years on capital, without much troubling the general public or the market.

The company was formed in 1870, and since then 257,250*l.* has been divided amongst the shareholders, or 12,500*l.* over and above the capital, which is 245,000*l.* The present position of affairs is very satisfactory, and is daily improving. The accounts presented at the meeting in April last showed a loss on the half-year ending December, 1877, of 1437*l.* 5*s.* 10*d.*, arising entirely from the drought which prevailed in California for two years. Mining industries during those years have suffered greatly. We have but to refer to the reports and accounts of English companies having mines in those parts for confirmation. The statements are similar to those reported from Sierra Buttes, but greater losses are shown. I refer more particularly to hydraulic mines, where the consumption of water is so great that it requires little rivers to keep them supplied. Birdseye Creek, Cedar Creek, Gold Run, and Blue Tent are examples. During the winter snow and rain has fallen heavily, and the water season is expected to be at least an average one. For the first time after receiving 21 dividends the shareholders are disappointed. After such a run of good fortune they have little cause to grumble; indeed, putting aside this temporary drawback, they have every reason to congratulate themselves and to be congratulated because of the promise the mine now holds out, and the new and hopeful features which have arisen. The balance carried forward is 9514*l.* 5*s.* 6*d.*; 5000*l.* of this is held as reserve, and is invested in United States 5 per cent. Funded Loan. There is an item in the balance-sheet rarely met with in those of mining companies generally; indeed, of any other industry worked by a limited company. It is the miners' deposits of 2800*l.* This not only shows the thrift of the miners, but asserts the confidence they have in the mine. It may be taken for granted that unless these men (who in many cases can judge the capabilities of a mine as well as their captain) were convinced of the soundness of the mine, they would not leave their earnings in the hands of the company to be used as capital. The working cost for the last half-year of 1877 was 8142 greater than the corresponding period of 1876, but it was necessary to have a large force employed, because at any time the water supply might have been obtained. While the mills were idle Mr. Johns, the able manager, wisely directed the labour to underground and surface repairs and improvements. The working expenses are low, and the various departments, such as boarding the men, are conducted on the most economical principles, the "find" for each man being about 316 per month. The Sierra Buttes part of the mine has no change, except the improvement in the 7th level, which may prove to be important. A number of seams of good quartz have here been met with, in which free gold is visible. Mr. Johns says there has been nothing like it ever found in the 6th level. As the 7th level has been comparatively poor this is encouraging. That which affects the future of Sierra Buttes most is the possession of Independence Mine; it was bought from the late company for 3624*l.* 10*s.* 6*d.*, but materials taken from it, and valued at 1027*l.* 17*s.* 5*d.*, brings the actual cost of purchase down to 2596*l.* 13*s.* 1*d.*

Independence adjoins Sierra Buttes on the west, and the veins worked in the latter run direct into the other, and form a large continuous true fissure auriferous quartz vein from 6 to 30 ft. in width, with well-defined walls. The area is 5000 ft. on the course of the vein, with a width of 250 ft. on each side of it. A discovery has been made in the sixth level, continued into the Independence Mine, of a most important character. The value of this discovery cannot be easily estimated. Mr. Johns reckons the ledge worth at from 112 to 115 per ton, but a telegram reports an improvement, and gives the value 220. This is richer than any of the quartz in Sierra Buttes proper. Should this high class ore continue, with a working cost of (say) 4 per ton, which is above the average, large profits must be made from this part of the vein. When the Independence Company was brought out in 1872 the calculations were based on 9 per ton, and on the output which it was reckoned could be treated; the annual profit was estimated at 27,800*l.* The quartz in the mine was considered to be practically inexhaustible. Mr. Johns says—"Mr. Jenkins has frequently told me that the previous owners had a very rich vein over this point in the No. 2 level, and as the third, fourth, and fifth levels have never been run as far west there is room for a good body of ore, and I hope we shall find it. It is quite possible that it may lead to a large body of profitable ore." This level (the sixth) runs below the lowest workings of Independence, as will be seen from the foregoing extract, and before getting under the shaft, about 600 feet east of the line, an immense body of ore may be discovered. What the old company was doing to neglect so important a part is difficult to surmise, and it must be annoying to the late shareholders to find the fruits of their adventure falling into other hands. There must have been bad mismanagement at the mines. Captain Kitto stated that the mine had been opened in an unmineral-like fashion. The run of the quartz vein through the entire properties cannot now be less than 8000 feet.

The Chairman, at the meeting last October, attached little value to the purchase of Independence as a mining property; now things are very much changed, and it is beginning to be appreciated. The Chairman must have forgotten at the time the opinions of experts and clever miners who visited and reported on the mine. Capt. H. Roseward said of it—"In Independence you have one of the best quartz mines in California." Capt. Kitto said, "It was one of the finest and best lodes it had been his privilege to see. . . . He had no hesitation in saying it was one of the finest quartz mines in the

world." Those opinions are in a fair way of being confirmed by actual results. About 50,000*l.* was expended on Independence by the late owners in erecting machinery and opening out the mine, making roads, erecting buildings, and constructing a flume or ditch to carry water to the mine. The mine was purchased by Sierra Buttes because of the water—at all events, this was said to be the chief reason. Mr. Schofield gave it as his opinion that these said rights were worth from 20,000*l.* to 30,000*l.* This gentleman has had a long experience in mining matters, and such an opinion would not have been given by him without an equitable reason for it. Now, if the water rights are of such importance, Sierra Buttes must be certain of a regular stream of water in the future. The manager reports that they are now sure of a good water season, so that large returns may be expected. The clean-up for March was 329,000; this return is larger than that of any month of the last half-year, and now that rich ore can be brought from Independence I should think that even better returns may be expected. It is not, however, immediate large returns that should be looked for, but future ones which cannot fail to be most satisfactory. I presume that the piece of ground 4500 ft. in extent, located by Capt. Kitto in the interest of the late Independence Company, and valued at 20,000*l.*, has come into the possession of Sierra Buttes. The prospects now before this company are undoubtedly brilliant, few gold mines have better. I cannot but think that it will prove to be a really great one, and before long it must rank as one of the first gold mines in California.

WILLIAM GABBOTT,
Stock and Share Dealer.

8, Drapers' Gardens, E.C., May 22.

P.S.—The clean-up for April is 330,369; cost, 318,413; profit, 2591*l.*

CHLORIDE OF ZINC, AND PEACOCK'S COMPOSITION.

SIR.—In your Notice to Correspondents of last Saturday's Journal I observe a singular query under the above heading—"C. H. A."—which might lead anyone to suppose that chloride of zinc had something to do with the manufacture of that successful composition manufactured by Peacock and Buchan, of Southampton, for keeping clean the bottoms of iron ships and preventing corrosion. Having known these gentlemen for many years and used their unequalled preparations against all others, I can safely say that there is no more affinity between the two articles enumerated than between cucumbers and solar rays (see "Gulliver's Travels"). Numerous parties have analysed this famous composition, and although they have ascertained what some of the ingredients are as presented, yet they have failed, one and all, in producing anything at all equal to it either in price or efficacy, for in the act of mixing chemical changes take place which have baffled the skill of able chemists; and although a party of savants in Paris a few years ago thought they had discovered the *modus operandi*, and manufactured a composition which they patented under the title of "Peacock Française", it did not succeed, and nothing has been found to equal the original invention, which I believe is not patented. It contains no deleterious substance whatsoever to injure the plates and rivets, like preparations of copper and mercury, and although tallow has for the last few years been used largely on iron ships with an idea that it costs less, it has been proved that tallow fouls much quicker than Peacock-Buchan's composition, costs more, and creates rusts and corrosion, owing to the sebaceous acid which it contains.

A SOUTHAMPTON SHIPPOWNER.

ROCK-DRILLS.

SIR.—The "flasco," as your correspondent Mr. George Cook, of Snaresbrook, calls the fact of no trial having taken place between the Ingersoll and Roanhead drills, is explained in exactly the same manner as the fact that we do not take up the gauntlet so valiantly thrown down by the proprietors of the Eclipse drill and compressor—that it is not our intention to advertise comparatively unknown and untried drills by a competition with a drill so well known as the Ingersoll. The gain to the Ingersoll if it came out victorious (as we do not doubt for a moment it would) must be nil, whilst the mere fact of having even taken part in such competition would be a good advertisement for either the Eclipse or the Roanhead drills. Should, however, a trial such as Mr. Cook suggests be arranged, we shall most probably put in an appearance, and make a very passable performance, even against the very best of the day.

London, May 22.

LE GROS, MAYNE, LEAVER, AND CO.

HAND-POWER DRILLS.

SIR.—When these drills were first introduced to the public I hailed their announcement as a boon to the practical miner, for although the machine-power drills must of course be infinitely more effective, yet they are too costly for a young or, I may say, an experimental mine, where in many cases the power required cannot be obtained at all, or if so may be far too costly for the ends to be obtained. But a hand-power drill such as is described would appear to meet one of the great needs of the mining interest of the present day. Will it do its work? I have been looking weekly for some notice in your valuable Journal of the machine from practical miners, for I could hardly conceive that anything so promising would be lost sight of in these hard days for metalliferous mining, but I have not seen a single letter on the subject. The inventors put forward a testimonial from Messrs. John Taylor and Sons, but it only refers to a granite quarry in France, and instead of being a recommendation it really looks suspicious, for Messrs. John Taylor and Sons, with all their large opportunities for employing the machine in this country and in Spain, might have 50 of them at work in lead or copper mines if they found them fit for the work. If any of your readers who have tried the machine will record notes of their experience in a letter to the Journal, I am sure they will deserve the thanks of the public, and will certainly receive those of—

May 21.

A MINER.

GEOLOGICAL MUSEUM—ABUSE OF PRIVILEGE.

SIR.—The letter written by "A Visitor," and published in last week's Journal, is well toned and much to the point, and as the subject is an important one we hope it will be taken up by many, and sifted to the bottom. It is a significant fact, and, indeed, it must be granted that the present age is pre-eminently a scientific one. The great importance of the correct study of Nature's laws, and the application of true deductions obtained therefrom, which should always conduce to the benefit and elevation of the human race, cannot be over-estimated; but it is, nevertheless, much to be lamented when we find that the great talents conferred upon persons and rendering them capable of penetrating into and discovering the hidden laws of the Universe should be perverted to the very meanest and worst purposes. What is man at the very best but a mere mortal, fallible, indeed, in every one of his acts, finite in his conceptions, and apart from every high and reasoning power of the soul, but a degree higher than the beast of the field. How, then, is it possible for the most talented to investigate into the existence and order of things so far as to determine with anything like truth how and when all things came into being. If all things were created not by evolution, but by a master mind, then there must have been a personal creator, or, to use a more philosophical expression, "a first cause," and if it were possible for mortal man to determine all this, then it must be conceded that he be must nearly, if not substantially, equal with the Creator himself. This, then, is the rock upon which scientific men fall, and upon which many of them are split. Science can only deal with tangible things, natural elements in fact; it cannot grasp, or even touch, those things which are revealed, and hence, because it cannot do this, men of science have concluded, and still conclude, that only tangible or natural things exist. Here, then, we have the primary cause of the existence of so many atheists. Your correspondent mentions two names well known in the world of science—one of them at least has been the inventor of theories and hypotheses, which are based, at least to a reasoning and sensible mind, upon nothing more than that of a strong imagination. If it could be proved by any such theories, or from any deductions obtained therefrom, which it cannot, that evolution brought all things into existence, as a matter

of course there would be no need for anything higher. Another world, for instance of a spiritual kind, governed by an order of beings higher in intelligence than mere mortals, because if it were possible to find out God man would at once become his equal, and, therefore, such a God would not be worth having. The great damage done by such wild theorists is not particularly felt by the learned, because they are able to penetrate the web, and upset the sophistry, but to the masses who are not so learned. We are not, therefore, surprised when we find men of the type and calibre of those mentioned by "A Visitor," leading a scientific but atheistical school that demagogues of a lower but not less pernicious order are also found collecting societies, and inculcating similar principles. Here in France, as your correspondent very truly remarks, the Sabbath-day is totally disregarded, everything going on precisely as on week days, and those blind leaders of the blind in London, and other parts of England, are only doing their best to bring about a similar state of things there to what we have here, which means the steady but sure fall of the English nation eventually. It is, to say the very least, a great misfortune that men of atheistical principles, no matter what their position and attainments may be, should have the power to make use of the public institutions of Great Britain for the purposes to which your correspondent very properly alludes. It is to be hoped that the people of a great and enlightened nation like England will at once set their face against the abuse of privilege, and also they will do well to remember that scientific men are not gods, but mere mortals like themselves. NOT A DIVINE.

Paris, May 20.

REMINISCENCES—No. V.

SIR.—Of all the pursers of mines I ever knew the late purser of the Budnick Mine, in Perranzabuloe, was the only one who demanded receipts from every man, or parties of men, to whom he paid money. The name of the purser was Mr. Michell, late of Compton, Truro, deceased, the father of the late Mr. Wm. Michell, the Registrar of the Vice-Warden's Court. If such a requirement were necessary the pursers of mines in general would have done the same, but it is not so; because the clerk who delivers the money, or the purser himself, if present, could prove the payment as having been made on behalf of the company. In addition to that, there is usually the presence of an agent witnessing the delivery of the money to the men. I never knew a single instance of a man denying the receipt of money paid him at a mine. So to demand a receipt from the men is a waste of time and money. When Mr. Michell did it the stamp duty was higher than it is at present. Persons should be careful never to give a receipt unstamped for a sum of 2*l.* or over. In Truro a lady pressed a man for the payment of 7*l.* He soon paid the money, and took an unstamped receipt for it. He immediately, in retaliation, went and informed against the payer, who was fined about 10*l.*

In turning over an old Journal a great many forgotten incidents come under observation. There is one under date March 17, 1835, regarding an old mine called Wheal Vraus, in the parish of St. Nevy. On that day a meeting of the company was held at Trear, in Breage, at an inn kept by the agent, Capt. Samuel Adams. The license was afterwards transferred to a house at Herland Cross. At that meeting there were 20 persons present, of whom two only survive to this day—Mr. J. Ridington and myself. The purser was Mr. Richard Penrose, of Redruth, long since deceased. The agent was not a very intelligent person; he did not appear to know minerals well; he was more a farmer than a miner, for he farmed about 100 acres of land. The mine was worked for tin, but none was returned—I believe. The agent would sometimes come with wonderful intelligence, with news that gold or silver was found in the lode; he did not know what it was, but certainly something very good. This was the first of my mining speculations; I held a 32*l.* part. The steam-engine did not work many months. The ancient workers had left marks of their mining there, which led to the opening. A celebrated stone, and called Menember Rock, of antiquarian interest is close by.

I see the tin sampled in February, 1825, at Wheal Vor was of the value of 885*l.* 16*s.* 2*d.* I also see the tin coinage for the quarter ending Lady Day, 1825, was as follows:—Harvey, Davey, Williams, and Co., 985 blocks; L. C. Daubuz, 938; R. A. Daniell and Co., 462; Daubuz and Foster, 312; R. Mager and Co., 344; Thomas B. B. and Sons, 509; Wheal Vor Adventurers, 1513; Grenfell and Base, 797; John Batten and Son, 296; Joseph Carne, 326; William Cornish, 180; total, 6665 blocks.

On May 14, 1825, a gentleman put into my hands a prospectus of a School of Mines in Cornwall—a quarto pamphlet, by Mr. John Taylor, of London, being a plan proposed for an institution for the education of labouring miners, arranged under the following heads:—The things most proper to be taught—First Class, Studies Mathematical—Certain branches of arithmetic; geometry; mensuration; surveying; dialling, and levelling; illustrative drawing and mapping. Second Class, Natural Philosophy—Mechanics and practical illustrations of the application of power, hydraulics and hydrostatics, pneumatics, machinery and the steam-engine, strength of materials, carpentry and construction in general. Third Class—Geology, mineralogy, chemistry, metallurgy, assaying, history of mining, art of mining in general. Proper situation for a school of mines, Redruth; probable expense of erections, 6000*l.*; estimated annual expense of institution, 1100*l.*; estimated annual revenue, 1650*l.* Such was the enlightened suggestion of the late good Mr. Taylor, but no action that I am aware of was taken upon it, the miners of all grades in Cornwall being at that time slow to perceive the necessity for any such technical education. Their fathers and grandfathers had managed to get on with their "practical" knowledge, and they could do the same.

Somewhere about the year 1836 the late Sir Charles Lemon, Bart., M.P., instituted such a school as an experiment in Truro. He agreed to pay all the expenses for two years, hoping that the gentlemen of the county would afterwards take it in hand, which they did not, so it fell to the ground. However, the necessity was subsequently supplied by the institution of the Miners' Association of Cornwall and Devonshire, which is now in effective operation. The future of the rising generation will supply better qualified agents, assayers, engineers, and managers than the past. We are, indeed, already witnessing the beneficial effects of education in the superior conduct of mining operations, as evidenced in the mechanical skill and economy exercised in nearly every one of our mines—in the boring and dressing departments especially. As to pumping-engines, it is remarkable that the duty, as recently registered, is far below that of 40 years ago. I should like to be informed how that is so. We ought not to recede in anything good. But for the skill and economy so exercised none of our tin mines could stand, except, perhaps, one or two.

On Monday, May 23, 1825, the tinstuff sampled for April at Wheal Vor amounted to 3707*l.* 13*s.* 8*d.*; at Wheal Vraeb, 543*l.* 19*s.* 4*d.*; at Carleen, 1551*l.* 17*s.* 8*d.*; and at Polladras Downs, 933*l.* 15*s.* 11*d.*; total for one month, 11,657*l.* 6*s.* 8*d.* I do not suppose any other one concern yielded so much tin in one month. The company sold one parcel or two of copper during the whole of the working—a period of about 40 years.

An author of a work on Cornwall says—"The state of the mines in Cornwall at this time (1812) is rather gloomy, and the most considerable of them at work are Huel Damsel, Huel Unity, Polidre, Huel Rose, the Consolidated Mines, the United Mines, Huel Fortune, Huel Virgin, Huel Jewell, Huel Gorland, Treskerby, and Treskavan in Gwennap; Dolcoath, Huel Carpenter in Gwinnear; Huel Alfred near Hayle; Penberthy Crofts and West Huel Fortune, near Marazion; and Huel Leed, Retallack, &c. Of these Huel Unity and Polidre are at the vast expense of 100*l.* a day; the latter from being long worked is very deep, and may be denominated a copper rather than a tin mine, since in this, as well as in many other tin mines, when a certain depth is attained the tin wears out and leaves a lode or vein of copper. The United Mines, recently set to work, will cost nearly 80,000*l.* before they can expect to yield any satisfactory return. Huel Damsel has turned a profit in eight years of 120,000*l.* Treskerby produced about 80,000*l.* in the same period, but is poor at present. Dolcoath, the deepest mine in the world, was set to work about 12 years since. It has cost the adventurers 70,000*l.* but has repaid that sum, with a profit of 40,000*l.* additional. The persons employed—men, women, and children—amount to about

1600. Its produce is from 60 to 70 tons of copper per month, with about 300,000 worth of tin. Huel Neptune is a good mine, and produces a profit of from 6000. to 7000. per month. Huel Fortune and Huel Virgin are likewise good mines; in the latter, which began to be worked in 1757, during the first fortnight the miners found as much copper as sold for 57000. and in the next week and two days as much as sold for 96000. more. Huel Towan within the last 10 years has produced upwards of 140,000, but it now only pays its way. Another mine called Wheel Busy has been lately reopened, but although the proprietors have laid out 70,000, in putting it to work it by no means proves so good as was expected. The most productive copper mine now working is that of Crinnis, near St. Austell. This mine had formerly been worked, but given up as unprofitable. In 1807 it was again opened, and has proved a very profitable speculation, yielding to the proprietors more than 20000. per month. Such was the description given of Cornish mines in 1812. Of all the mines named Dolcoath is the only one now in operation, and has yielded since then enormous profits.

About 50 years ago I had a conversation with a man—a mechanical engineer—who gave me the following statement. He was going on a road, near to which was a shaft, with a windlass at the top. He looked down, and saw a man at work in the bottom, about 15 fathoms from surface. He took up a small stone, and dropped it perpendicularly on the man's head, not thinking that the velocity acquired in falling would give a fatal blow. It killed the man, but the cause of his death was never revealed to the public. The homicide repented of his sin, and it is hoped was pardoned by the Great Legislator.—*Truro, May 20.* OBSERVER.

DEVON CONSOLS—TWELVE MONTHS PAY—CO-OPERATIVE STORES.

SIR.—I have watched for many years with pleasure the views you have taken, Mr. Editor, in the *Mining Journal* in the interest of both employer and employed, and the comments you have made for the last few weeks in favour of the only true and honest system of having twelve monthly payments at Devon Consols for twelve months work, which, to me, is so manifestly just as between the company and those employed by it that I must confess I cannot for the life of me understand why the miners, or even any others in the company's service, desire to dictate to the directors in the way they do for 13 payments. If they are paid, as most assuredly they would be, for 52 weeks work by 52 weeks pay in twelve monthly payments, why all this unnecessary outburst of indignation and uncharitable feeling towards the directors, either collectively or individually, and aimed by those who have no true interest either in the company or towards the poor deluded miners, unless it be by some little petty shopkeepers, who have ground down these misguided miners with charging them exorbitant prices for inferior articles, for all sorts of provisions and goods. If the workpeople in these and other mines I could name in the neighbourhood were to awake up to their true interests in this state of things which exist in the neighbourhood they would endeavour to organise a proper co-operative stores, by which I will venture to assert, without fear of contradiction, they would obtain their goods at least 20, 25, 30, and in some cases 40 to 50 per cent. cheaper, and of a very great deal better quality. A question of this sort is of vital importance I conceive to everyone employed at Devon Consols—such a vast saving of 3s., 4s., 5s., and 6s. in every 12. worth of goods is a matter for serious consideration, and I take it for granted that the directors would give every encouragement and a helping hand to a proper organisation for a stores on the mines, where goods could be shipped to Morwellham, and taken up from there to the mines by the company's railway, or otherwise by railway direct to Tavistock. We all know what a wonderful revolution co-operative stores have worked and are working throughout the length and breadth of this country for all sorts of provisions and goods. Any of these co-operative store books of prices demonstrate these facts, and the one I now have before me confirms fully the foregoing statements as compared with shopkeepers' prices either in towns or country villages. As I said before, this is of vital importance to Devon miners, but they can receive no assistance in this respect either from directors or shareholders whilst they continue their present hostility to the only just and reasonable demands on behalf of a company which has been the means of feeding and clothing them 32 years with a most liberal hand during the days of great prosperity, but now that company's copper ores only bring about 22. per ton instead of 60. or 70. per ton, makes a vast difference in the financial arrangements of this company; so much so, as it becomes a serious question for the directors and shareholders to consider whether it would not be, as has been suggested by both, that at any rate for the present, or (say) the next three or six months, until better prices can be obtained for copper, not to raise or sell any more, and by such a course some 6000. to 10000. a month would be saved; hence the services of those who have thrown themselves out of employment would not be required.

I see in your last *Journal* the directors have advertised for rock-boring machinery—why was not this done before, seeing that there are so many mines working these excellent machines in sinking shafts, driving levels, stopping ore ground, &c., at three and four times as much in a month as is done by miners, and at 30 to 35 per cent. cheaper. If our home mines are again to pay dividends to shareholders, they must be worked by boring machines; I feel convinced of this; and drive 6 to 8 or 10 fms. a month, instead of as now, only 2 fms. by the miner. Turning again to the calendar month, it has been said by the miners that if the Devon Consols men consented to work a five-weeks month the company might only pay them four weeks. Of course if men reason like this, and are so obstinate, they must take the consequence, when they have before their very eyes the resolution of the board of directors that for 52 weeks work they shall be paid for the same time—eight months of four weeks, 32 weeks; four months of five weeks, 20 weeks; total, 52 weeks. I quite approve of this, as I said before, just and honest course as between the shareholders and those employed by the company. The directors have a right to look to the present deplorable state of the copper trade, giving away prices for copper ores, and the general interests of the shareholders, as well as those who are employed, and I sincerely commend them for so doing. The miners or their assistant satellites or agitators would not pay calls for the shareholders I imagine. The directors must be masters—not those who they employ.—*May 23.* A LOOKER-ON.

THE FIVE-WEEKS MONTH.

SIR.—The apparent determination of the Devon Consols directors to return to the old system of five-weeks months, and the firm resolution of many of the men to oppose it, is in the present state of mining much to be deplored; at the same time I cannot disabuse my mind of the fact that the men are being, and have been, ill advised. In all strong measures of this kind mediation is the proper remedy, and had the officials suggested conciliation in the first instance with a view to an amicable settlement, and induced the men to retain their places until such times as a conference of masters and men could have been held, I do not doubt but long ere this the whole matter would have been satisfactorily arranged. I have always been, and still am, under the impression that at the time the proposed change took place—the alteration to 13 months pay—that it was a scheme of some of the Cornish pursers and agents to obtain another month's pay under the guise of benefiting the men, and now that our mines are struggling for an existence it is the imperative duty of those in command to insist upon the entire abolishment of the thirteenth month, at least as far as agents and pursers are concerned; and in the case where committees do not exist it is the duty of the shareholders to take the matter in hand for themselves. I would not for the present interfere with the men, as it matters little whether they are paid 12 or 13 times in the year. At the same time I have an idea that more frequent pays, as has been suggested in the *Journal*, would prove a great boon and be beneficial to the miners. I have reasons to believe that there are strong supporters in the county of the proposal to do away with the thirteenth month pay, at the same time there is the objection to being prominent movers in bringing about the desired change. Why

do not some of the principal shareholders in Phoenix, Dolcoath, and Carn Brea form a committee to act and call a meeting of the community so that the whole matter may be thoroughly discussed? I venture to say that if this was carried out few arguments could be raised against the scheme, and it would ill become officials to advocate a continuance of the payment of their salary for 13 months for 12 months' services.—*May 23.* SHAREHOLDER.

DEVON GREAT CONSOLS—THE FIVE-WEEKS MONTH.

SIR.—Will you kindly allow me once more to plead the cause of my parishioners who have refused to work under the five-weeks month? In the first place, this is not a strike for wages. If it were so most certainly we, "clergy and others," should have stood aloof from it, for we know that such strikes are generally useless, and often disastrous. If it were so there would have been some ground for expecting the men to yield on the promise of full wages for their fifth week's work. On the contrary, this is simply a protest against a thoroughly bad system of payment, which we know from experience brings upon the workmen the greatest discomfort and distress, whilst it fosters unthrifty habits by almost compelling them to live on credit. All persons who are really acquainted with miners and their homes will confirm the truth of this statement. The practical evils of the system are so obvious that it was publicly condemned at a representative county meeting held at Truro six years ago, when it was at once generally abandoned in these Western Counties. Therefore, in treating this as a public question, and protesting against the revival of this system, we are simply maintaining the protest made by the two counties six years ago.

Secondly, it is not fair to make the agents the excuse for this retrograde step. If the agents are too many, or their salaries too high, the obvious plan is to get rid of them, or reduce their salaries in a straightforward way. It is perfectly clear that a return to the five-weeks month is not needed to secure any saving so far as they are concerned. Therefore, if a saving is to be made by it, it must be at the expense of the workmen. But no, we have been told over and over again that this is not a workman's question, that the workman will not lose sixpence by the change. Then it comes to this, that no saving is to be made by it; and we are constrained to ask, "Why, in the name of common sense and common kindness, is this hated and condemned system to be brought back upon us?" "Oh, but," we are told, "it is so much more convenient to have the same periods of selling and paying." Now, Sir, I should like to know whether there is any other industry in the world, except mining, in which employers would venture to urge such an excuse as this for deferring the payment of their workmen? Moreover, whatever the inconvenience of the four-weeks payment may be, I am assured by managers of other mines in the neighbourhood that it is far more than made up for by the increased energy and cheerfulness of the men. It is one of the simplest rules of political economy to make your money go as far as possible, and it needs no especial wisdom to see that wages will go further and secure a better return when they are so paid as to make men prosperous and contented. And surely, Sir, if the inconvenience to managers and accountants were ten times greater than it is pretended to be, that ought not to weigh in the balance for one moment against the serious evil effects of this five-weeks system in hundreds of the households of the poor labourers.

I can well understand that a director of several mines must find it convenient to have them all worked on one plan. But I will still believe that this chief director of Devon Great Consols is a man of kindly feeling, who does not wish to offend or distress his workpeople; and, therefore, I am sure, if he only knew how this five-weeks system is dreaded and abhorred by West Country miners, he would readily forego his own convenience rather than force it upon them. Why will he not put himself in the place of the miner, and feel with them as we do? He cannot think that these shrewd, hard-working men are such children as to cry out when they are not hurt, and to call the fifth week the black week if it were as bright to them as other weeks. I very earnestly beg him to reconsider the matter from this point of view. Let him seek economy in the management of the mine and we can but commend his prudence; let him get his work done at the lowest cost at which it can be well done and we have no right to complain. Only let him leave us the blessing of the four-weeks month, and instead of being regarded as a selfish, unfeeling dictator, he may yet live to be called the miners' friend. D. P. ALFORD.

St. Paul's Vicarage, Tavistock, May 22.

DEVON GREAT CONSOLS.

SIR.—I have just received a half-yearly report of these mines, in which the five-weeks month question is specially referred to, and from which it would seem to anyone at a distance that the "directors" are quite unanimous on the matter. Now, I have this very day seen an extract from a letter from Mr. W. A. Thomas, who has been Chairman of the company for the past 34 years, and he says—"In my opinion it was a false move on the part of Mr. Peter Watson, and the four-weeks system having been adopted for some years, I am at a loss to conceive what good can arise from it." From this it is evident there is something behind the scenes, and that the shareholders were being blindfolded; I shall, therefore, move the adjournment of the meeting, in order that time may be given to arrive at the truth. These mines are fast falling into disrepute, and the true cause should be fully known. A SHAREHOLDER.

May 23.

DEVON GREAT CONSOLS.

SIR.—This being the last opportunity that will be available to the correspondents of the *Journal* before the annual meeting, I am desirous of submitting the following points for the serious consideration of the shareholders. First and foremost it must be distinctly borne in mind that the men are not the aggressors, nor is this in the ordinary acceptance of the term a "strike." The men have submitted uncomplainingly to every request of their employers in reference to their earnings, but they have been pledged for years, and the two Western Counties are pledged never under any circumstances to join in permitting the return of the five-weeks system of payment in any possible shape or guise whatever. The doom of the five-weeks month has been completely sealed by the landowners. Mr. Basset, one of the largest proprietors in the county of Cornwall, inserts a clause in his leases that the miner shall be paid at periods of not less than four weeks, and oftener if he claims it. His Grace the Duke of Bedford, the owner of the land on which Devon Great Consols is situated, will be immediately petitioned to establish the same rule, and it is said that in certain leases now being prepared his Grace has given instructions to adopt it. The originators of the present wide-spread misery and want should face to face with the shareholders be called upon to give a concise and straightforward explanation stripped of all extraneous plausibility as to the reason (if any reason there can be) of their enforcing on the men a system which it was well known was utterly detested by every miner in the land.

It should also be ascertained upon what principle of right or reason a respectable company can on any plea whatever conscientiously demand of the monthly men, or any other men in their employment, to give up to them, their employers, one clear four-weeks month of their hard labour in every year. It will moreover be important for the shareholders in their own interest to ascertain the exact conditions of a certain contract which has been most curiously entered into for the sale of one of the greatest and most valuable products of the mines. The time of the contract, whether one month, two, or twelve. The amount of security required, and the nature of that security. The number of times the contract has been broken. The standing and general transactions in life of the contractor or contractors, as the case may mysteriously happen to be, who would seem for months past to have had the company so completely hampered, gripped, and controlled, and the quantity taken away or paid for under such contract.

Furthermore it should be a matter of special and stern enquiry how any board of directors can justify the fact of their having kept

in store ready for market the largest stock of a certain refined mineral ever known in the history of commerce, whilst the poor men who raised this rich commodity from the deep and dangerous recesses of the mines by the sweat of their brows should have been paid off at starvation prices for their labour. Finally, and above all, it should be strenuously and earnestly urged upon the meeting on behalf of the 700 industrious men, women, and children, who have been driven remorselessly to the very verge of starvation, that they are still the willing and obedient servants of the company, ready to submit to any reasonable request with regard to their hard-earned wages, and that all they ask for or require is to be paid their gettings as before, and not in a time of deep depression to cause them distress by lengthening the time of payment. All other large bodies of workers in the kingdom are paid much oftener, but this the miners have not required; surely, therefore, such a reasonable and respectful appeal can never be made in vain. X. Y. Z.

May 22.

DEVON GREAT CONSOLS.

SIR.—I find from the public press that the labourers have, *en masse*, deserted the Devon Great Consols, on the question which goes under the name of "the five-weeks month." To say that their conduct was injudicious is too mild an expression—it is downright folly and wickedness. Is it not wicked for the father of a family to refuse work when he can have it, and by that refusal bring his family to the border of starvation? If it were a question affecting the consciences of men, their refusal to work on the calendar month system would be regarded as magnanimous; but conscience is not involved, and, therefore, I say that men are not justified in dropping their work, as they have done, without first knowing they can get employment elsewhere. It is wicked to do so, and the men deserve no sympathy from anybody. The resident director informed the men that they would have five weeks' pay for a five-weeks month, and that, therefore, they would sustain no loss, and consequently no injury. But the men insist on having their own way, and I hope that the shareholders will insist on having theirs; and, if so, the men and women who deserted the mine will have to look about for some other field for operation. I take it that abundance of men will be forthcoming to substitute the deserters when it becomes known that the shareholders, at their forthcoming meeting, endorse the directors' resolution to return to the ancient and convenient calendar month mode of payment. I dare say when the men find that the shareholders will not yield to their stubborn will they will come to their senses, and take to work, according to the good old rule. A great deal of error has been imported into the discussion on this question. One is that the men would have to wait, in some cases, nine weeks for a pay. Such would not be the case. Payment would be monthly, however the contracts might be made, for, sub-sist, I am assured, would be paid where the contract is for two months or more, as the case might be. I have no wish to see any injustice inflicted on the men, who have inflicted a great injustice on themselves and families, but to see men act in consistency with common sense—a faculty which they seem to have discarded in this matter, as is shown by their desertion of labour. If the resolution of the directors involved any tyranny over the labourers I would inveigh against them as bad men; but there is nothing of that nature in the case. The men should not assume to dictate to the directors; the "servant should not be above his master." *Truro, May 22.* R. SYMONS.

MINING IN NORTH DEVON.

SIR.—It has caused me much surprise that there has not been more adventures in mining in North Devon, for there is not a part of that county more rich in its minerals. No one has sunk below the base of the hills except the late Mr. Anthony Hill, and he sunk about 12 fms., from where he had raised several thousand tons of the richest red hematite and of the best manganese ores. There is plenty of the red hematite and of the manganese ore, as well as copper, silver, lead, and nickel; of this my own practical experience causes me to judge, and to any gentlemen who would like to entertain the operation I am quite willing to point out the places they should sink them.—*London, May 22.* NORTH DEVON.

THE MINING INTERESTS.

SIR.—There are periods, epochs, or cycles in the progress, expansion, or depression of mining, equally marked and significant with those that have typified the career of every other important branch or department of the pursuits and industries of the commonwealth. We cannot venture to hope that mining shall prove exempt from checks and depressions more than manufacture, constructive enterprise or shipping, building, railways, and telegraphy, to say naught of commerce, trade, banking, insurance, gas, water, and dock companies, that afford employment, absorb capital, create wealth, and enrich the community. We should remember that it is necessary to restrict and control inflated prices and feverish expectations, as on the contrary to encourage and stimulate action whenever healthy properties and industrial pursuits stand depressed so far below the true standard of actual and normal worth as to endanger the vitality and maintenance of invested capital required, at all times indispensable, to the employment and utilisation of the sinews and muscles of the working and labouring classes.

We have arrived at just such a period, or cycle, in mining at this moment as to necessitate every exertion being made to revive the stagnant spirit of enterprise displayed in every department of this all-important branch of wealth and employment. With tin ore at 35s. a ton, copper ore 12s. per unit, lead 16s. a ton, and lead ore, 70 per cent., 9s. a ton, with Scotch iron ranging from 2s. 10s. to 3s. 10s. a ton, and Welsh bars at 5s. to 5s. 5s. a ton, we contend the contention between capital and labour—strikes and lock-outs—is a disgrace to the intelligence, character, and stability of the country, and justify the contempt and derision of the foreigner. Yet good must inevitably spring from this confusion and chaos prevailing throughout North and South Wales, the Forest of Dean, the Midland counties, and the cotton manufacturing districts. Labour cannot fructify without capital, and the latter must in the struggle prove master—thus it will assuredly follow that the wage of labour will fall materially, and probably to the minimum price paid for the last three decades. The market value of commodities demand it, and the labouring classes will have to submit. The workmen in the cotton districts had far better spurn, or at least wholly discountenance, the thrifty selfish demagogues who mislead them, than to wreak their vengeance on masters who are wholly unable to pay the wages demanded and to meet obligations for textures and materials absorbed in production. As regards mining for the higher class metals—copper, tin, and lead—if market prices of shares rule low, and all but totally neglected by the public, the inherent resources of many stand unsurpassed in production, bulk, and quality compared with the palmiest days we remember. There can be no doubt of vast returns and, in instances, dividends in the immediate future, while the prices of shares bear favourable comparison as desirable investments with any other industrial undertakings throughout the length and breadth of the land. Take, for example, Wheal Peavor, selling for 18,0000., and paying good dividends; Mellanear, 40,0000., with immense reserves of ores, commenced to pay dividends, with pioneer points good. Then we have Pateley Bridge, 12,0000., a certain prize, only requiring a little more energy to become a first-class property—the bottom level yielding 4 tons of lead ore per fathom. Eliza Consols, a brilliant success, but a private company. D'Eresby Mountain, 40,0000. to 50,0000., promises to become a great and profitable mine; South Condurow looks well and pays well. West Wheal Seton, 80000., a wonder of neglect; Lisburne, 22,0000., prospects good and improving. Tyn-y-Fron, 15,0000. with an ore lode at the adit level, 75 to 80 fms. in length. Herod-foot, 70000., and expected at normal prices for silver-lead soon to resume dividends. Temple is likely soon to develop into an established prize; the workings will prove inexpensive, and in the hands of Mr. Charles Thomas careful and sound management may be relied upon. His work—*Investor's Handbook*—is well worthy the earnest perusal of investors. Again, Blaen Caelan is likely to turn up a trump. The discoveries are most favourably reported upon. The mines referred to are all deserving of special attention, and every

information and data can be obtained by intending investors upon application by letter.

It is no use mining without the true elements of success, or in districts destitute of minerals in paying quantities, nor to embark into schemes and companies wherein promoters secure the lion's share. The Memorandum of Agreement is a very important document, and so also is the last statement of accounts. These should be carefully read and examined by all associated with mining—as witness West Chiverton; what a contrast from one meeting to another.

R. TREDINNICK,
Dealer in Stocks and Shares.

Exchange, Coleman-street, London, May 22.

CONSUMPTION OF COAL—STEAM-ENGINES—LORD DERBY.

The following letter has been addressed to the Editor of the West Briton.

SIR,—The Earl of Derby, at a gathering of business and scientific men in Liverpool, dealt with the question of wastes, and particularly the waste in the consumption of coal, in the following words:—"I am almost afraid to repeat the calculations which I have heard from many competent men as to the saving which might be made in the production of steam-power. Many will tell you, and I believe it is not an extreme estimate, that by taking the country through the same result as now obtained per indicated horse-power, might be got by the burning of one-half the coal, or even two-fifths, of what is now actually consumed."

There will be many of your readers, and perhaps the majority, who will at once say, on reading the above extract from Lord Derby's speech, that it cannot apply to this county. I shall not in this letter pass judgment on the consumption of coals in the county in generating steam, but simply make a few statements in order that the question may be calmly and practically discussed. I am assured it will meet with attention from the mine adventurers. It is to them, and particularly to the lords of the mines, a question of the greatest gravity. It is, in fact, a matter of life or death to many a struggling concern.

To any of those who may anxiously desire to take up the subject in a practical form, I would observe that there is an instrument termed an indicator, the cost of which would not exceed 10*l.*, by which the duty of an engine in horse-power can be easily indicated. By this test you get the actual, or useful, or dynamometrical horse-power; in short, the net power, after allowing for friction, and this alone is the power with which users of steam-engines are concerned. This duty should be entrusted to an impartial and competent person in association with Mr. Lean, who reports the duty of some of our engines in his monthly publication. Reverting to the steam-engine, it may be wise to affirm that it is popularly understood to be a machine whereby the force of steam is enabled to produce motive-power; philosophically, however, it is an apparatus whereby the latent energy of coal is first of all developed into molecular motion manifested as heat, and eventually into that form of motion known as motive-power, and practically, therefore, the ordinary steam-engine is simply an arrangement of mechanism for producing heat and transforming it into power.

The next point is coal. Favre and Sibedman, both high authorities, state that 1 lb. of coal will liberate during complete combustion 14,500 units of heat, each unit being equivalent to 772 foot pounds. The mechanical equivalent of the heat developed by the combustion of 1 lb. of coal is, therefore, (say) 14,500 by 772, equal to over 11,000,000 foot pounds—a horse-power being equal to 33,000 foot pounds per minute, or 1,980,000 foot pounds per hour. The combustion of each pound of coal per hour liberates heat enough to develop (say) five-horse power, and in perfect steam-engines the consumption of coal would be about at the rate of 1-5th lb. per hour for each horse-power developed; but the highest result obtained in actual and continuous working is 2 to 2½ lbs. of coal per indicated horse-power. The difference, therefore, between what is theoretically proved to be possible, and what to this date is held to be practicable, shows that the practical is 9-10ths in excess of the theoretical consumption. If we take 2 lbs. or 2½ lbs. as the highest duty obtained per indicated horse-power, there will be no difficulty in arriving at a conclusion as to the relative duty of engines erected in the North, and the duty of engines erected in Cornwall. I think the highest duty shown on Mr. Lean's "Reporter" is something over 10 lbs. of coal to each indicated horse-power, and as there are many engines not reported consume more than 20 lbs. per horse-power, I make the following calculation (say) for an engine of 200-horse power, working 80 hours per week instead of 160 (this allows eight hours for stoppage, and calculating coals at 12s. 6d. per ton), in order that your readers may see clearly the startling difference in the costs of an engine that does its work economically, and the costs of an engine that does its work badly:—2 lbs. of coal per indicated horse-power for a year is 464*l.*; 5 lbs., 1160*l.*; 10 lbs., 2320*l.*; 15 lbs., 3480*l.*; and 20 lbs., 4640*l.*; thus showing a difference of 4000*l.* annually on an engine of 200-horse power consuming 20 lbs. of coal instead of two. The above figures more than substantiate Lord Derby's statement that 50 per cent. more of coal is used than is needed.

I have not the time needful to estimate the entire horse-power of all the engines in the county, but such a duty might, with benefit to all, be delegated to the young chips who talk of everything but common sense in the mining classes. It is appalling to think to what an extent the non-useful has been patronised in this elementary judge-room. The above subject is worthy of Mr. Collins's ability, and to him I commend it. Mr. Lean would doubtless be glad to assist him in so necessary a work. When an engine consumes so little as 2 lbs. of coal per horse-power we know that the coal is good, and the engine well constructed, and the gear work and stoking well attended to. It is fair, on the other hand, to say that no engine, however good, can do its duty unless supplied with the best coal; neither will good coal deal out its power in an imperfect engine. The whole question centres, so far as tests are concerned, on the two points—the excellency of the coal and the excellency of the engine. One may be good and the other bad, but to secure efficiency both must be good. I have already indicated the simple way in which the duty of an engine in horse-power may be ascertained. I now refer to the mode of testing the duty of coal. There is an invention for this also, but, to make it short, it is understood that 1 lb. of good Welsh steam coal is capable of generating sufficient heat to evaporate 15 lbs. of water. The coal thus spoken of is coal fresh from the pit, but if this coal were exposed and taken from a heap it would undergo partial decomposition, and imbibe moisture, and thereby lose much of its calorific power. I estimate that the coal used in Cornwall evaporates about 6 lbs. of water to each pound of coal used.

The public have never done justice to engineers or to engineering claims. Engines are not made by the rule of thumb. There is in every perfect engine such a sum of mechanical nicety that one cannot but feel disgusted that an article so unique and simple in all its parts should on leaving the foundry be entrusted to any drunken fool for erection. In my younger days the engineer was valued and well paid, and would as soon entrust his child to the tender mercies of the Bash Bazouks as entrust the erection of an engine to a thing called a working engineer. I have known Grose and West in daily attendance until the engine was ready to work, working and examining the parts, but since kid gloves have become fashionable this duty has been sadly neglected, and hence much of the evil the country is now suffering from. Engineers ought to be paid handsomely, but paid according to indicated duty, and then the wastes now so manifest would soon disappear. Some adventurers are blind in respect to this subject; they expect a manager to be responsible for everything, and to do everything. The managers have quite enough to do in other matters without attending to the mechanical.

Let me, therefore, give an illustration, showing the result of a test made of the duty of an engine in the North. It seems fabulous, but as the authority from which I make the extract is unquestionable it would be wrong to your readers not to give it. How the coal used in that instance was approximately disposed of—Lost through bad stoking and incomplete combustion, 10 per cent.; carried off in the chimney gases, 30 per cent.; carried away in the exhaust steam, 50 per cent.; utilised in motive power as per indicator, 10 per cent.; total, 100 per cent. The above shows that only 10 per cent. of utilised power was obtained.

The causes of waste are so many that it will be quite impossible to do more than enumerate a few, and I think no one after their perusal will be content to allow the blind, the lame, and the halt to any longer deal with interests so vital as the charge of a steam-engine. First waste: The coal that falls through the bars as unburnt coal or ashes. The coal that passes up the chimney in the form of smoke and soot. Further quantity not consumed, in the form of carbonic oxide. The moisture in coals, and the loss of heat in evaporating the moisture. Surplus air and the difficulty of bringing the carbon in contact with the oxygen is a prolific source of loss. The lack of complete combustion of the coals. The gases passing into the chimney at less than 500 Fahr. Uncovered pipes. Filthy engines, causing needless friction. There are other causes of waste, but from those I have enumerated it is possible to waste 50 per cent. of the generating power of the coal.

This letter has already trespassed seriously on your space, and I dare not prolong the subject by going further into detail. I am actuated in writing this letter by the deep interest I feel in the existence and prosperity of mining in this county. I see no immediate prospect of a rise in the price of tin; it may even go lower, and in such a case, without further economy in the use of the unproductive articles used in mines, poverty of a fearful character seems in reserve for the poor, and serious loss for the adventurers. The quality of the coal has certainly in some instances improved of late, but so essential is it that the best should be had that whoever puts a finger up in opposition to the utmost economy deserves to be hooted. Let the calm and thoughtful who wish to know about the future ask Mr. T. S. Bolitho or Mr. J. M. Williams. Those gentlemen are head and shoulders above all others in their power to gauge the future; and I think they will tell anyone who may be fortunate enough to obtain their opinions that unless economy in mechanical appliances, as in boring, is carried out in all its integrity the future will be one of serious evil to many mines. The duty of engines under the management of the Messrs. Taylor, at the Consolidated and United Mines, Gwennap, was the highest ever attained. Since the Taylors left the county the duty has steadily declined. Can Hocking and Loam account for this? They had charge of the Great Consols engines. OMICRON.

CORNISH AND DEVON NOTES.

SIR,—At the PARRACOMB SILVER-LEAD MINE the promising indications reported in my letter of the 6th inst. seem about to be realised, as since the agent's report of last week an important discovery has taken place in No. 1 lode, which continues to improve, and from present appearances it is confidently expected that this point, independent of the others, will yield sufficient ore to pay cost of working.—At GREAT WHEEL ELEANOR it has been a source of great interest to watch the progress of the mine for some time past, and were it not possessed with resources of no secondary character it would not have withstood the amount of ill-feeling and suspicion as to future results that have been brought against it. However, there is no doubt but that old things are fast passing away, and all things becoming new, and a rich reward remains in store for those who prove as true in their holdings as the mine is likely to do in its dividends; and in my opinion at no distant day it will be referred to as being Great not only in name but also by its monthly sales of tin and its dividends.—At WEST COMBARTON the position of the mine fully illustrates the folly and inevitable results of depending for guidance upon those who are unacquainted with the mineralogical character of the district, and of merely skinning the surface. There is little doubt that a good mine would be opened up if sinking took the place of drivage, and it is confidently hoped that the directors will forego all other considerations, and set earnestly to work to retrieve their lost position.—At GREAT WHEEL RODD the lode cut into in the deep adit is 6 feet wide, carrying two regular walls, and is composed of quartz, pryan, and rich silver-lead ore. As the drivage is proceeded with into the hill towards the junction of the two lodes it vastly improves, and its character strongly indicates a good and lasting mine. The allotment of shares took place last Wednesday, and I purpose to inspect the property in a few days, when I will send you further particulars.—*Exeter, May 24* R. J. RUTTER.

SILVER-LEAD MINING IN DERBYSHIRE.

SIR,—I should be very glad, and I dare say many other persons would, if your intelligent and well-informed Correspondent who contributes the weekly article on Mining in Derbyshire would enlighten us still further on this interesting question.

1.—What parts of Derbyshire are the most favourable for lead mining? 2.—What is the cost of sinking and driving in the strata? 3.—What is the average depth of the veins of lead from surface? 4.—What is their thickness, width, and length? 5.—What direction do they run? 6.—Is the country thoroughly honeycombed with workings—ancient and recent? 7.—Is there and (and where) virgin ground? 8.—What is the probable cost of erecting smelting-works to smelt (say) 30 tons of ore per week? 9.—What is the cost of smelting? 10.—What is the value in ore and smelted, respectively, of blue, brown, and white lead? 11.—Have large blocks of lead ore been found, and where?

I have recently become interested in Derbyshire lead mining, and wish to become more so. My own impression is there is a grand future for lead mining in Derbyshire; but confirmatory evidence from your able Correspondent would urge one on to bring capital, experience, intelligence, and push into the county, where mining in some parts seems to belong to the middle ages.

F. G. S.

[For remainder of Original Correspondence, see to-day's Journal.]

THE WILD DUCK, OR SPORTSMAN'S ARMS.

"Well, comrades," says Uncle Henny, "we are mit again all well, and tho' the times are gloomy we are still able to have a bit of good dinner and drop of something to drink. Some may cock up their noses at our little mittens, but I don't think we need care a pin about such people, for if we like to tell about old times and old bays we don't hurt anybody." "No, sure," says Jan Temby, "and we could tell a good many going about a thing or two the don't know." I suppose," says Jan, "you all knowed old Capt. Philip Richards, father of the late Capt. John Richards, of Gwennap?" "Yes, to be sure we all knowed Capt. Philip." "Well," says Jan, "when I was a boy Capt. Philip was a very old man, and I often heard 'n telling about Bolenowe old bal. Polgine, Newton Moor, and Old Tye. He said the Newton Moor Valley and Old Tye wor the biggest stream works when he was a boy in the parish of Camborne." "Isa, isa," says Old Tom, "but where did the water come from, Jan?" "Why," says Jan, "you all know the great clay pits in Bolenowe old bal. Now, lew me ax ee, where did the water come from for the stream works in that place?" "From Chycarne Moor," says Uncle Henny, "for I have ben scores of times over the banks of the old leats, and 'twas very easy for the water to run down hill from Bolenowe old bal to Newton Moor and Old Tye." "That's very true," says Old Tom, "but such a plan never entered my old head." "I suppose so," says Jan Temby, "but from the washing and streaming for hundreds of years before bals begun there was a wonderful body of clay in the eastern part of Old Tye, near Jacky Eustis's house, and a brick kiln was built then to make this clay into bricks. I often seed this kiln and the bricks, but don't know what made them stop." "I can tell ee more," says Jan; "Betty adit was drove across the east part of Condurrow, Old Tye, and Newton Moor to Polgine, about two miles. Condurrow was a rich mine 54 years ago. Capt. H. Williams was manager, and Lawyer Davey, of Redruth, the purser, and—lew me see—I think it wor about 40 years ago that Condurrow, Old Tye, Newton Moor, and Polgine wor took up by Capt. William Thomas, who intended to push Condurrow deep adit right across the valley to Polgine. Now that, men, wor what I count a grand speculation, and ben proved so since. Capt. W. Thomas put the first steam-engine ever sen in that valley in Newton Moor, and I heard 'n say he borrowed the engine from the late Capt. Teague, of Bank House, Redruth, but the principal adventurers could not go on; the bals wor all stopped, and Capt. Thomas went to Ireland to take the management of mines, and ben there ever since. Everything, com-

rades, is plain and easy after a es discovered, but when Capt. Thomas put up the first engine in Newton Moor West Frances, West Basset, South Frances, and North Basset wor not discovered, and when Mr. Charles Fox and others wor asked to join in working Newton Moor and Old Tye the all had a fine opinion of the ground, but said the time for 'n wor'n come. Capt. Teague died about that time, or he would have took up half of the consarn." "That's a very good account, Jan," says Old Tom, "but I reckon I know something too about that there district, and so well as I can mind tes 33 years ago since Capt. Nicholas Vivian took up Condurrow, and, as he tho't, had all Mr. Pendarves's ground going south to join Newton Moor, but when a come to take up the lease Old Tye was cut off, and made into South Condurrow, and several of the adventurers wor so vexed about it that the throw'd up their shares. Capt. Nicholas told me so himself; so you see that South Condurrow, as a bal, is only 30 years old." "I was born not far from Troon," says Jan Jewell, "and I know, for I worked there, that the western end of Polgine would beat a good many bals in the parish for copper and tin if put to work. The ground is easy, and the tin and copper rich, and a good deal of work could be done for a little money. I would rather venture a pound there than a penny in some bals I know." "So would I," says Jimmy Dowa, "and I wonder the old bal es'n't worked, but I suppose strangers don't know a bit about Newton Moor and Old Tye—as one is now South Condurrow and the other Wheal Grenville." "I like old names best, and many old customs too," says Uncle Henny, "for we've had nothing but poverty and distress since the four-weeks months. Now, we are all working men, and willing to work hard to get a honest living, and as we have talked over the thing between ourselves a hundred times we are sure that four weeks, five weeks, or seven weeks can make no difference to a man's wages. We know when a bal is poor we mustn't expect to get so good wages as when a es rich, but when a man has a fair piece in sight for so much as a can do for a month, I should like to know if a five-weeks es'n't better than a four-weeks? A man must be amazed to say to the contrary. I tell ee, men, I wish people would lew well alone. Lev the five weeks come in as the used to, but give the sist in the middle of the month. The man that cut off sist and bro't in four-weeks months is no friend to the working miner, and the shop-keeper in the long run will rue the day he ever seed a four-weeks month." "I'm sure of that," says Old Tom, "for four-weeks months work well seat them all, and very soon too."—*From Cousin Jack's Unpublished MSS.*

CAMBRIAN MINING COMPANY (LIMITED).

The rich mines worked by this company are progressing in the most satisfactory manner. Another large parcel of copper ore is now being prepared for market, also a considerable parcel of lead. Capt. John Lean has lately inspected the mines, and it will be observed from the following that he quite agrees with all the other practical authorities who have inspected the Cambrian Mines—that the ultimate power of production of the Esgair-Fraith and Esgair-Hir is almost without limit. Capt. Lean in his report to the directors says:—

In accordance with your request I, on the 15th inst., carefully and thoroughly inspected your mines, which are situated about seven miles to the east of the Llanfangel Railway Station, Carnarvonshire. They are amply supplied with efficient machinery, worked by an abundant and permanent supply of water, which renders unnecessary the cost attendant on the motive power of steam. The drawing apparatus and appliances are complete and effective, and there are suitable tramroads and wagons for the removal to and fro of the different classes of material. On reaching the Esgair-Hir Mine, on the western side, I found the famous Esgair-Hir lode, which is of extraordinary width and strength, and is traceable by shaft sunk on it (no fewer than eight in number) within the distance, by other surface openings, and by its visible outcrop or back through the whole length of the Esgair-Hir Mine, or (say) for an extension of not less than two miles. The direction of this lode is about east and west, with a slight incline northerly; its composition as creative of metallic wealth is all that can be desired. It has been worked only for a short distance from the central point, or engine (Pen-y-Bwch) shaft; they, notwithstanding, from the great width and fertility of the lode, extracted from this limited length lead ore to the value of a million pounds sterling. At a distance of (say) 300 fathoms to the east of Pen-y-Bwch shaft I entered by ladders the new shaft, sunk to the adit, a depth of 11 fms. In the adit, a few fathoms west from said shaft, they have recently driven through the lode to the south part of it, where it was found to be ore; on this they opened a level 5 fms. east, and stopped its back 4 fms. in length, and in height also 4 fms.; a lode yielding 2 tons of lead ore per fathom. Under this stop has been sunk a fathom or two of winze, with a yet improved lode; here they have driven west also 14 fms. and have recently turned southerly in order to cut through or intersect the yet more southerly part of this gigantic lode, so as to ascertain its size or total width, and to prove its character. This is in the midst of virgin ground, of which there are hundreds of fathoms on the run or direction of the lode between the eastern end of the old workings from the Pen-y-Bwch shaft and the boundary line which divides this sett, Esgair-Hir from that of Esgair-Fraith, a section of ground highly worthy of being energetically wrought. The adit in which throughout is laid a tramroad is from the above named new shaft to its mouth 300 fms. in length, the mouth being at the boundary line between the two mines and at the Esgair-Fraith dressing floors. In the adit 230 fms. to the west of its mouth, or 70 fms. easterly from the new shaft, they are driving a cross-cut north to intersect the lode, which passes a little to the north of the adit; this intersection they expect to effect in at most a couple of fathoms more driving.

ESGAIR-FRAITH.—This mine adjoins, on the east, Esgair-Hir.—Eastern Shaft: This shaft is securely timbered and divided for winding, has substantial and efficient pitwork, and a safe and good ladder road or footway. It has been sunk to the depth of 33 fms. below the adit, and 48 fms. from surface. The adit has laid open an immense mass of gossan (oxide of iron) of the finest and best description, the all but never-failing companion or harbinger of metallic riches, whether of silver, copper, tin, or lead. The shaft for a few fathoms from surface was sunk vertically, but it soon entered the lode, in the midst of which it has been continued to the present bottom—I say in the midst, or possibly it may be in the middle, for the size of the lode is such that it is next to impossible that any shaft on any level could embrace its whole width. The 10 east has been extended from shaft 17 or 18 fms. in a good lode, or part of lode, producing both lead ore and that of copper—say, 2 tons of copper ore per fathom, but in parts of the bottom of the level it will yield of lead ore not less than 3 tons per fathom.

A rise is now in course of being put up in the back of this level (the 10) to communicate with a winze sinking from the adit not only for the purpose of opening out the ground for stoping, but also with the object of ventilating the mine. The 10 west has been driven about an equal distance from shaft—say, 18 fms.; loded a character throughout the same as that of the 10 east, and, in fact, I may say that of the whole of the ground that has been laid open; throughout the whole yet have a profitable ore yielding lode, the composition of which, gossan and ore with a mixture of carbonate of lime, is highly satisfactory, and, as a matter of course, your products will increase in proportion to the extension of your levels, and the laying open of your ground for stoping; but new mines necessarily require a little time to receive its full development. At the shaft in the 20 the lode has been opened to a width of 16 or 18 ft., but it is evident that a considerable mass of the same yet stands to the north; hence, although I have above named the yield of ore as 3 tons per fathom, yet this can apply only to the part embraced by the respective workings—say, from 4 to 5 ft. width of lode. What, therefore, remains in the mass that is standing unbroken it is impossible to say. No one can with any degree of certainty state what the lode's full produce is, or rather what may be when broken all through or removed, but the probability is that here (as yet) concealed its richest part, for nothing can exceed the fine character of the parts the lode as seen standing at the sides of the levels. The 23 east has been extended from shaft 22 fms., and west 11 to 12 fms. In the character and quality of the lode at this level in all the length opened, there is no distinguishable difference, nor is there any from that as mentioned in the 10. In the 23 west a rise has been put up and communicated with the 10. About midway between these two levels a rich copper ore stop has been taken up from the shaft.

I would remark here that seldom if ever have I seen in the United Kingdom copper pyrites of so rich a quality as yours at the Esgair-Fraith: it was only during the many years which I spent amidst the rich mines of Chili that I remember of having seen its equal. Your eastern shaft is now down 10 fms. below the 23 fm. level, and as heretofore has been carried down in the midst of the lode; neither wall seen, its width is, therefore, unknown. Whilst I was underground the shaftmen made a blast in the part of the lode standing at the north or hanging side of the shaft, just above the bottom, which broke into a thickness of yellow copper—copper pyrites—sufficient to yield 3 tons to a fathom, but the blast did not break through the whole thickness of the ore; it left ore still standing or remaining behind it, so that its real width cannot be seen or ascertained until cut through. A good lode has accompanied the shaft to the bottom. Seldom, indeed, have I seen a lode of such strength, magnitude, and apparent merit as that in your mines. A mile (say) to the east of your eastern shaft an adit level has been taken up from the valley, and extended towards it to a length of 114 fms. into the mountain. The lode in this adit present the same characteristics as are seen in the openings on the western side of said mountain. This adit also has been opened in the middle or midst of the lode—neither wall seen—so that its width is, therefore, unknown; they have now, however, determined on cutting through it. In closing my report, I would remark that there are three most prominent and important points which demand particular notice—that of the cross-cutting and driving north of the adit at the Esgair-Hir Mine. Should the result at either of these points of operation prove as anticipated, it will augment to an incalculable extent the value of the mines.

HOLLOWAY'S OINTMENT.—Sores, wounds, ulcerations, and other distressing affections of the skin, are amenable to this cooling and healing ointment. It has called forth the loudest praise from persons who have suffered for years from boils, leg ulcers, and chronic ulcers, after every hope of cure had long passed away. None but those who have experienced the soothing effect of this ointment can form an idea of the comfort it bestows by restraining inflammation and allaying pain. Whenever this ointment has been once used, it has established its cure, and has again been eagerly sought for, as the easiest and safest remedy for all ulcers and complaints. In neuralgia, rheumatism, and goat the same application, properly used, gives wonderful relief.

price the shares of this company sell at, seeing the property is in a good district, and the manager thinks it as good as any in New Zealand, which is saying a good deal. The amount of preference

shares required to be subscribed to keep it going is very small, and it is scarcely possible they will not all be taken up. All the dead work is now done, and the mine laid open, with every prospect that a fair trial will turn it out a very great success. Within the last six months two new claims have been discovered—from the one 180 tons of quartz have been crushed, yielding 1060 ozs. gold, and realising 3180l.; the other promises to turn out far richer. The veins of gold in these two claims are dipping west, first into the Golden Point ground, and afterwards into the Kapanga, which shows the magnificent position of the company's property.

ARENAL MINING AND SMELTING COMPANY (Limited).—This company's property is situated about ten miles from the shipping port of the same name in Norway. The sett is over two miles long by about half-a-mile wide, and along the greater portion of it the lode has been proved by sinking pits or shafts. The ore shows a considerable progressive improvement in quality, according to depth. The property has hitherto been worked privately in a most primitive manner, but the present company is opening out the mines more vigorously, and as soon as the machinery is erected and the tramway completed the output will, it is estimated, be 1000 tons per month, and as the ground is easy to work large profits should be made. Assays of the ore gave 18½ and 16½ per cent. for copper. There is no royalty, and the surface rent does not exceed 100l. per annum. The capital is 48,000l., in 4l. shares.

HALKYN DISTRICT DRAINAGE COMPANY.—The Rhosmor Mine shares, noticed lately as likely to be benefited by the operations of this drainage company, promoted by the Duke of Westminster and others, have been raised to 50s.—60s., or 40s.—50s., owing to the prospect of a speedy draining of the mine. It is not improbable that it might be drained any day as the rate of progress being made with the tunnel by cutting into an open cross-course. Another mine may also be mentioned—the Deep Level—which will also be one of the first properties drained, so it is a first-class speculation, and may be worth 100 per cent. better during the present year, as the tunnel is being driven at the rate of nearly 50 yards per month. At the meeting of the Drainage Company, held lately, the engineer gave it as probable that the great mines, even as far as Rhyd Allyn, would be drained by August or September next—in about 200 yards further driving—so, if this turns out the case, Rhosmor may rise to 10l. or 12l. each, Deep Level to 20l., and the Drainage Company's shares to 15l. or 20l. each, with similar advances for Rhyd Allyn, &c.—the last-named is, in fact, already doing well above the water level.

MONTEZUMA MINE.—This new Mexican property which was lately offered in England, was not taken up owing to some misunderstanding about the purchase-money, and it is understood the price of it is to be raised owing to the closer approach of the railroad. This lode is near the well-known Aztec Mine, and is reported to be even richer than the Aztec. The lode has been traced for about one mile. About 600 tons of ore have been extracted, and two test runs at the Aztec mill have given a result of 75 per cent. so, if it can regularly supply a 30-stamp mill with ore of this value it is probably the richest lode in the world. The gold occurs in a free state, so the common stamp-mill will be employed, so almost the lowest grade ore could be profitably worked.

Subjoined are this week's quotations, &c., of mining and metal shares quoted on the Scotch Stock Exchanges:—

Share.	For share.	Paid up.	Dividends.	Description of shares.	Last price.
Previous.	Last.	per annum.			
COAL, IRON, STEEL.					
4	10	£2	£7½	Arnstown Coal (Limited)	7
10	10	4	4	Bunhar Coal (Limited)	57. 10s.
100	50	22s. 6d.	3s. 6d.	Bolckow, Vaughan, and Co. (Lim.) ..A.	54½
10	10	10	10	Cairnabie Gas Coal (Limited)	8½
10	10	10	10	Chillington Iron (Limited)	60s.
23	20	10s. 10d.	1874	Ebbw Vale Steel, Iron, and Coal (Lim.) ..	6½
10	6	nil	nil	Fife Coal (Limited)	70s.
10	10	nil	nil	Glasgow Port Washington Iron & Coal (L)	35s.
10	10	nil	nil	Ditto Prepaid	40s.
10	10	nil	nil	Lochore and Caplethrae (Limited)	80s.
10	10	nil	3	Marblehead Iron Ore (Limited)	50s.
10	10	nil	nil	Monkland Iron and Coal (Limited)	35s.
10	10	5	4	Ditto Guaranteed Preference	60s.
100	100	nil	nil	Nant-y-Glo & Blaithwa Ironworks pref. (L)	19
6	6	nil	nil	Omoa and Cleland Iron & Coal (L. & Red.)	7s. 6d.
1	1	15	15	Scottish Australian Mining (Limited) ..	35s.
1	10s.	15	15	Ditto New	18s.
Stock	100	nil	nil	Shotts Iron	91
COPPER, SULPHUR, TIN.					
4	4	—	—	Canadian Copper and Sulphur (Lim.) ..	4s.
10	7	57½	15	Cape Copper (Limited)	29½
1	1	7½	2½	Glasgow Caradon Copper Mining (Lim.)	20s.
1	15s.	7½	2½	Ditto New	13s.
10	9½	nil	nil	Huntington Copper and Sulphur (Lim.)	33s. 6d.
25s.	23s.	—	—	Kapunda Mining (Limited)	1s.
4	4	—	—	Panajiello Copper (Limited)	15s.
10	10	6	6	Rio Tinto (Limited)	60s.
20	20	7	7	Ditto, 7 per cent. Mortgage Bonds	137½s. 3d.
100	100	5	5	Do. 5 p. cent. Mor. Deb. (Sp. Con. Bds.)	60
10	10	22½	20	Tharsis Copper and Sulphur (Limited) ..	22½s. 3d.
10	7	22½	20	Ditto New	15
1	1	—	—	Yorke Peninsula Mining (Limited) ..	5s.
1	1	—	—	Ditto, 15 per cent. Guaranteed Pref.	15s.
GOLD, SILVER.					
1	1	—	—	Australian Mines Investment (Limited).	8s.
5	5	7s. 6d.	7s. 6d.	Richmond Mining (Limited)	9
OIL.					
10	7	6	15	Dalmeny Oil (Limited)	7½
1	1	7½	25	Oakbank Oil (Limited)	40s.
1	5s.	—	25	Ditto	11s. 3d.
10	10	2½	7½	Upshall Mineral Oil (Limited) "A"	7 10s.
10	10	—	—	Ditto "B" Deferred	10
10	10	—	—	West Calder Oil (Limited)	40s.
10	8½	9	17½	Young's Paraffin Light & Mineral Oil (L)	15½
MISCELLANEOUS.					
50	25	5	6	London and Glasgow Engineering & Iron	24½
7	7	10	15	Shipbuilding (Limited)	9
10	10	6	6	Phospho Guano (Limited)	11
10	4	0	6	Scottish Wagon (Limited)	2s. 6d.
10	4	0	6	Ditto New	2s. 6d.

NOTE.—The above lists of mines and auxiliary associations are as far as can be ascertained, Scotch companies only being inserted, or those in which Scotch investors are interested. In the event of any being omitted, and parties desiring a quotation for them and such information as can be ascertained from time to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as full as possible.

J. GRANT MACLEAN, Stock and Share Broker.
Post Office Buildings, Stirling, May 23.

NEW RIVER COMPANY.—Messrs. Fox and Bousfield offered for sale at the Auction Mart 30 100l. shares in the New River Company (fully paid up). On submitting the property the auctioneer stated that the income of the company last year was 15,000l. more than the previous year, and that the present income is double what it was 12 years ago. The shares offered were all readily purchased at 330l. each, representing a premium of 230l. per cent. Every class of shares in this company appear to be at an enormous premium. The nominal value of the King's shares, and what are known as the Adventurers' share, was fixed by Act of Parliament in 1855, when the company applied for power to create new shares, at 21,000l., and last week one-quarter of an Adventurer's share and one-quarter and one-fifth of a King's share were sold at prices representing 93,000l. as the value of a whole share, being a premium of between 300 and 400 per cent. in little more than 20 years.

A NEW INVENTION.—A. L. Dana, has invented an apparatus for saving gold without the use of quicksilver, for placer mining and stamp mills. It is designed to catch the finest of flour and float gold. In fact it seems next to impossible for the metal in even the minutest particles to escape. By the use of this machine in stamp mills, copper plates and quicksilver are entirely done away with and no gold escapes. For placer mining the machine is kept in motion by the same water that washes away the gravel. The gold is received in the head of the machine, which can be taken out through a small door arranged for that purpose, which is kept locked during operations. The gravel is put in at one end of the machine and discharged at the other, and passing over the iron screen, in its passage through the finest particles of gold are collected at the discharge end and received in the head of the machine till taken out at convenience. The invention can be worked by hand if not convenient to a stream of water, and will be manufactured in different sizes, to suit all purposes. It can be seen in operation at the works, Holladay-street, Denver Tribune.

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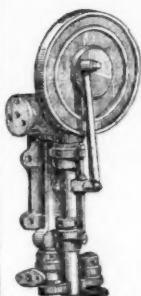
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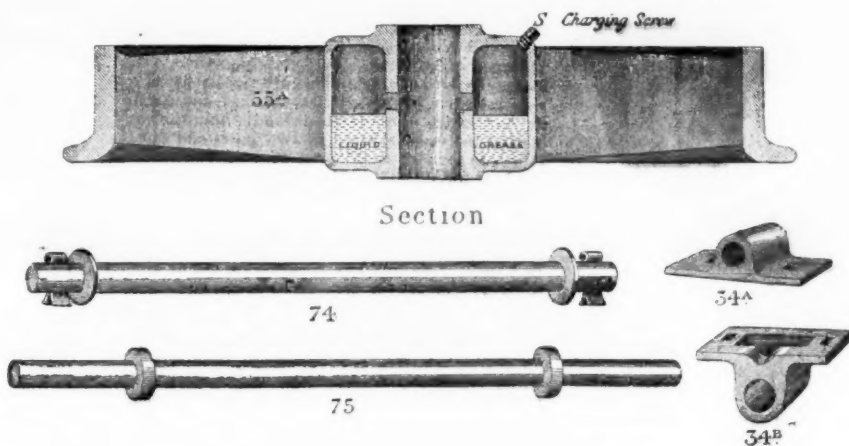
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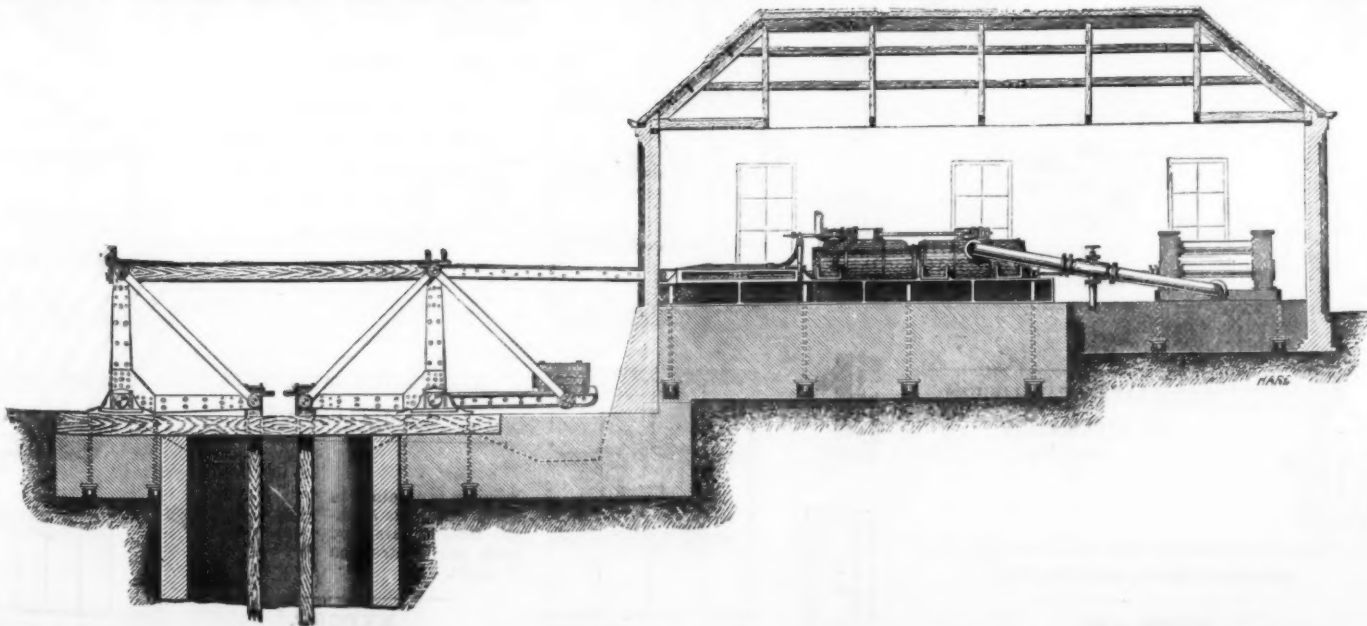
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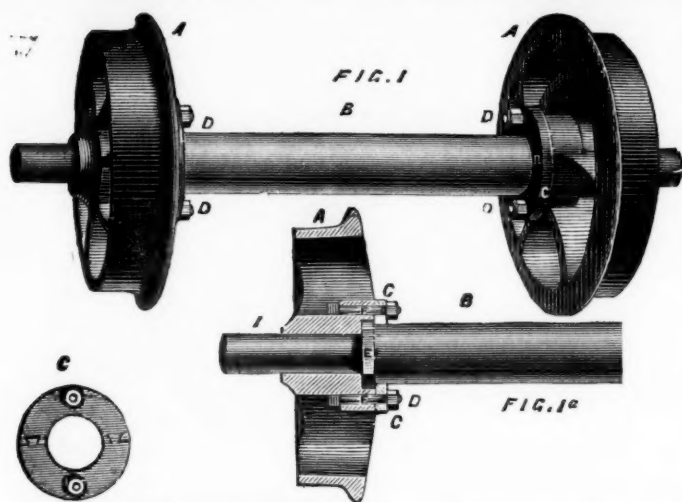


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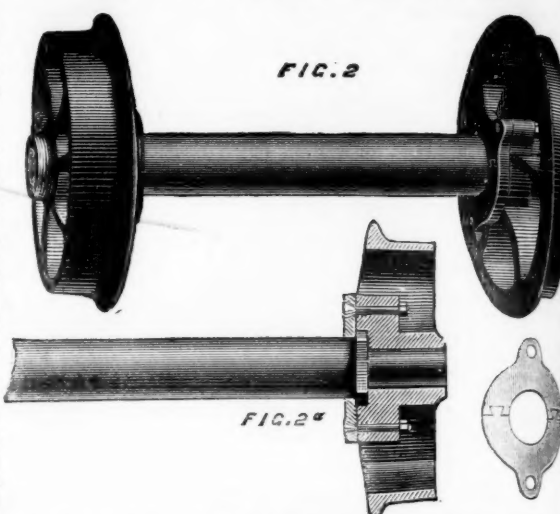
A New Patent Method of Fitting up Wheels and Axles.



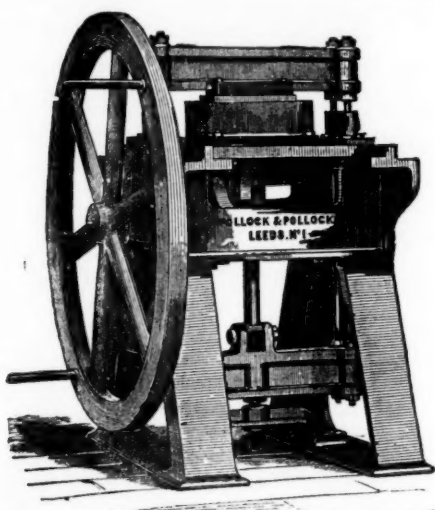
Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings, and Figs. 2 and 2a for inside bearings. A A, are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle, which is forged of solid steel; the axle is secured into the recess partly by being sufficiently tightly fitted to require driving home with a hammer, and partly by the washer. Around the axle adjoining the boss is fixed the washer, made in two parts and dovetailed, so as to allow of being fixed after the collar has been forged on the axle. The washer is secured to the boss by bolts and nuts, both in outside and inside bearings; in the case of inside, by means of lugs cast on the boss, and the washer made of corresponding shape; the washer is made of crucible cast steel. The only tool required for fitting is an ordinary spanner for outside bearings, and a box spanner for inside bearings.

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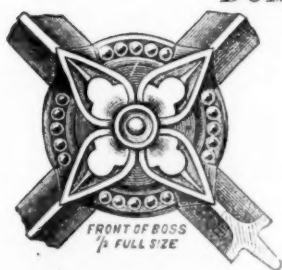
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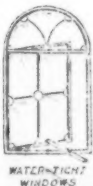


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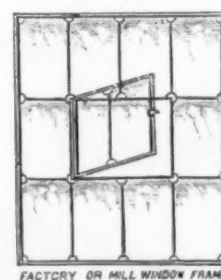
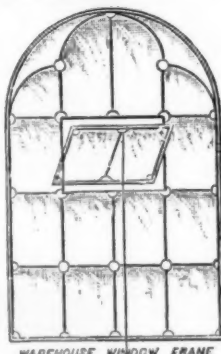
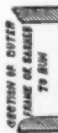
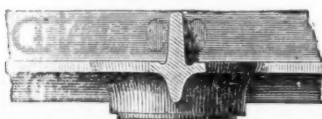
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HOME AND

SOLE MAKER—J. T. HARRIS, Engineer, Ironfounder, and Manufacturer,

SAFE, STRONG ROOM, AND PARTY WALL DOORS, AND EVERY KIND OF CONSTRUCTIONAL AND BUILDERS' IRONWORK, LIFTS, HOISTS, ELECTRIC BELLS AND TELEGRAPHS, &c.
90, CANNON STREET, LONDON, E.C.; AND BEAUFORT IRONWORKS, BRISTOL.

PATENTED IN



FRANCE,
GERMANY, AND BELGIUM.

—CAN BE DESIGNED AND MANUFACTURED
TO SUIT ANY STYLE OF ARCHITECTURE
OR POSITION WHERE A WINDOW MAY BE
REQUIRED.

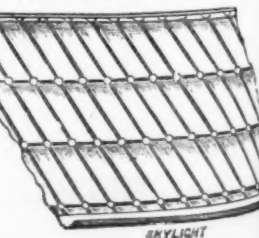
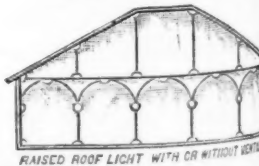
ARE BEING EXTENSIVELY USED IN—

Lunatic Asylums, &c.,
Public Buildings, Banks,
Wharves, Warehouses,
Factories, Mills,
Breweries, &c.,
Engine Houses.

ILLUSTRATED CATALOGUES
ON APPLICATION.

Security is obtained in
these Skylights with-
out Guard Bars, and
with less obstruction
to Light.

EXPORT.



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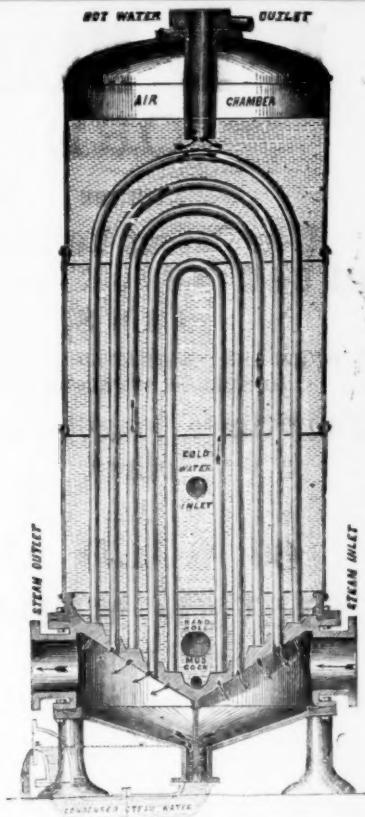
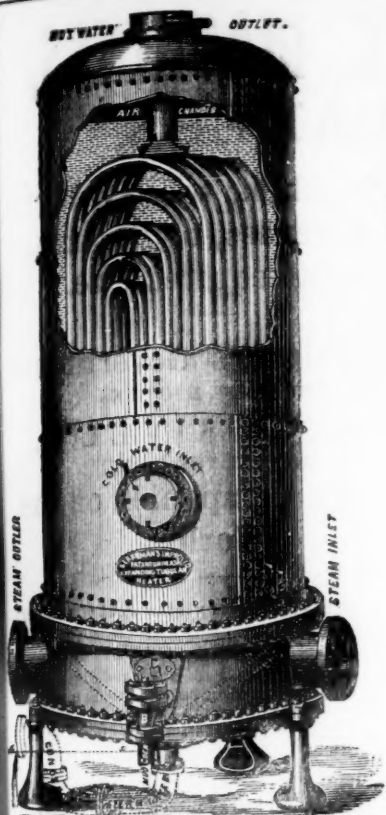
IMPORTANT.

JOSEPH WRIGHT AND CO.

(LIMITED),

NEPTUNE FORGE ENGINE
AND BOILER WORKS,

TIPTON, STAFFORDSHIRE,



Having purchased the Engineering Business lately carried on by R. BERRYMAN AND CO., at 23, Congreve-street, Birmingham, and 28, Wilson-street, Finsbury-square, London, have removed the whole to their Works at TIPTON, to which place ALL COMMUNICATIONS SHOULD IN FUTURE BE ADDRESSED, and where the BERRYMAN HEATER can be seen at work, and in every stage of manufacture.

Being the SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their HEATING SURFACE and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

GREATLY REDUCED PRICES.

This arrangement of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER FOOT OF HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE and BACK PRESSURE from exhaust pipes.

ALL THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL TO METAL, and every tube is free to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No scurf adheres to the tubes because of the difference of expansion between SCURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.

Only one pump or injector is required, and as the Heater is placed between the pump and the boiler, the water is forced, COLD, into it, and passes out at the top HOT into the boiler direct. Where the WATER WORKS PRESSURE is sufficient no pump or injector is needed.

The water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided, the sewage and other loose matter in the water being deposited in the Heater, the acids are liberated there instead of in the boiler.

Every part can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASH-BOUSES, AQUARIA, GREENHOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are now at work as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

The New Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using FOUR HUNDRED AND THIRTY-THREE of these Heaters.

COLEBROOK'S PATENT STEAM PUMPS, FOR HIGH OR LOW LIFTS AND GENERAL PURPOSES.

SOLE MAKERS,—

MAY AND MOUNTAIN,

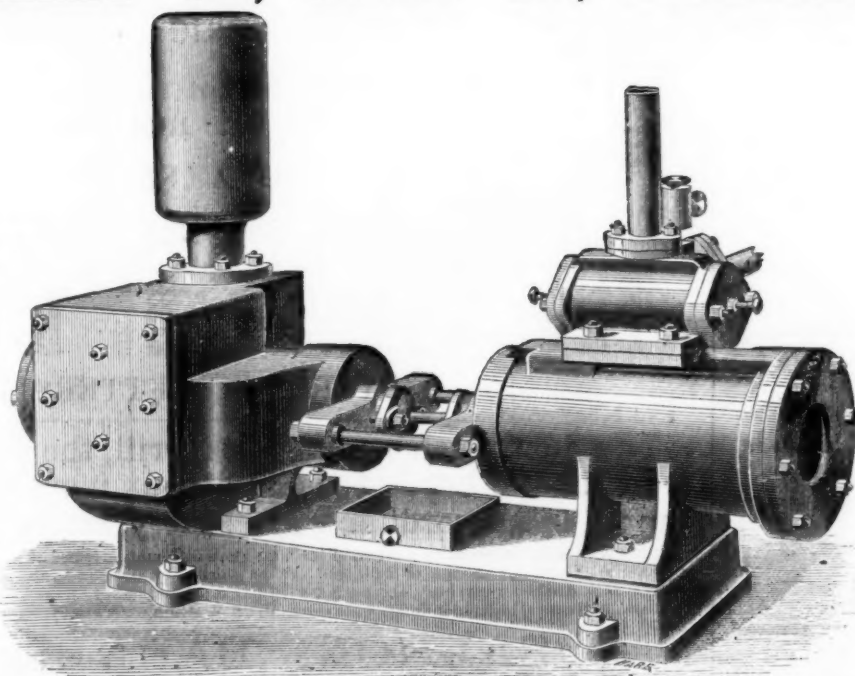
BERKLEY ST., BROAD ST., BIRMINGHAM.

The accompanying Engraving represents a Steam Pump, suitable for general purposes; it possesses the following advantages over any other Steam Pump yet before the public:—

1st.—No tappets, eccentrics, levers, or other mechanical appliances are used to actuate the steam slide valve, but this office is performed by the exhaust steam.

2nd.—The only working parts in the steam cylinder are the piston and slide valve, and as there are no working parts in either the piston or cylinder covers, the full length of stroke is obtained.

3rd.—The slide valve is so easy of access that it can be examined, cleaned, and replaced in a few minutes, and it is impossible to make any error in replacing it



after examination, because it is immaterial which way it is inserted in the valve-box, whether one way or the other upwards, or whether end for end.

The Pump Valves are Colebrook's Patent, and are made in one piece. They are either of canvas, leather, india rubber, or other material, to suit the nature of the liquid to be pumped, and can be replaced in a very short time by any ordinary workman.

These Pumps are suitable for hot or cold water, hot or cold wort, sewage, ammoniacal liquor, tar, &c., and are adapted for use in breweries, chemical works, collieries, paper mills, dye-works, brick-yards, and for almost any other purpose.

SIZES AND PRICES OF COLEBROOK'S PATENT STEAM PUMPS.

Diameter of Steam Cylinder.....Inches	1½	3	3	3	3	4	4	4	4	5	5	5	6	6	6	6	7	7	7	7	7	8
Diameter of Pump Cylinder.....Inches	1	1½	2	2½	3	2	2½	3	4	3	4	5	3	4	5	6	3	4	5	6	7	4
Length of Stroke.....Inches	6	12	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Price	£12	£16	£17	£18	£19	£19	£20	£22	£25	£23	£28	£32	£26	£33	£36	£41	£30	£38	£41	£45	£52	£40
Diameter of Steam Cylinder.....Inches	8	8	8	8	9	9	9	9	9	10	10	10	10	10	10	12	12	12	12	12	12	...
Diameter of Pump Cylinder.....Inches	5	6	7	8	5	6	7	8	9	5	6	7	8	9	10	6	7	8	9	10	12	...
Length of Stroke.....Inches	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	...
Price	£45	£50	£56	£65	£50	£55	£60	£70	£81	£62	£68	£70	£80	£95	£100	£80	£85	£90	£100	£115	£135	...

H. R. MARSDEN, PATENTEE AND ONLY MAKER **BLAKE MACHINES,** OF THE WELL-KNOWN **ORE CRUSHERS AND STONE BREAKERS,**

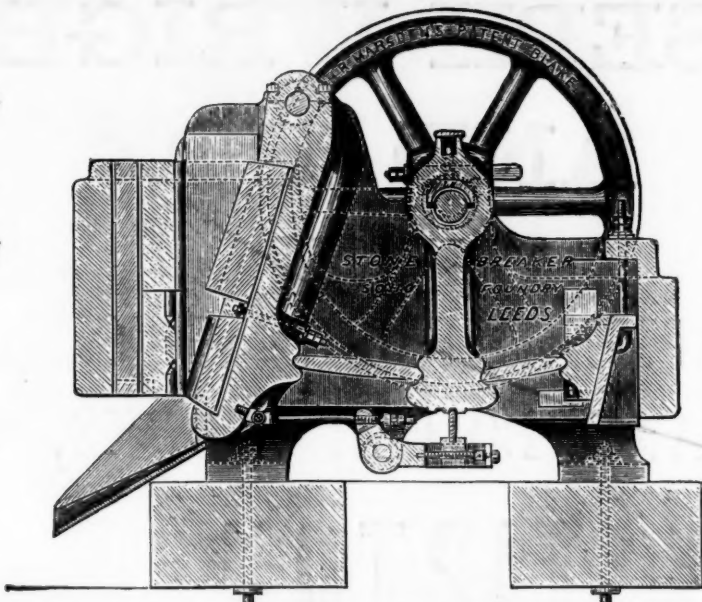
WITH THE
**New Patent Reversible
CRUSHING OR CUBING
JAWS,**

WHICH ARE CONSTRUCTED OF A PECULIAR
MIXTURE OF METAL, WEARING

**Four times longer than any
other.**

**60 GOLD AND
SILVER MEDALS.**

**OVER 2000 NOW IN
USE.**



**For Crushing to any degree
of Fineness, or Breaking
to a required size.**

**Her Majesty's Government
USE THESE MACHINES
EXCLUSIVELY,
ALSO ALL THE GREAT
Mining Companies of the
World.**

H. R. M. has long observed the want of cheaper
machines,
STONE AND ORE CRUSHERS,
And has at length, by means of improved appliances
for the production thereof, been enabled to reduce
the prices, yet keep up at the same time the well-
known strength of construction. Reduced prices
on application.

FIFTY per Cent., and upwards, saved by using these Machines.

TESTIMONIAL FROM MESSRS. JOHN TAYLOR AND SONS.

DEAR SIR,—We have adopted your Stone Breakers at many of the mines under our manage-
ment, and are pleased to be able to state that they have in all cases given the greatest satisfac-
tion. We are, yours faithfully,
H. R. Marsden, Esq.

INTENDING BUYERS ARE CAUTIONED AGAINST PURCHASING OR USING ANY INFRINGEMENT OF THE NUMEROUS PATENTS OF H. R. MARSDEN.
ILLUSTRATED CATALOGUES, TESTIMONIALS, and every information, on application to:—

**H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.
ONLY MAKER OF SAULT'S PATENT SYPHON CONDENSER.**

DEAR SIR,—I have broken over 40,000 tons of very hard LIMESTONE into ROAD METAL, for
the Newport and other Road Trusts, in your PATENT STONE BREAKER, AND ALL WITH
ONE PAIR OF JAWS, which are STILL IN USE. I do not think at all, but am quite sure you
are the only Machines which fully perform the work you set them out to do, and there are none
in the Show can at all compare with them. Yours, truly,
H. R. Marsden, Esq.

WILLIAM PRICE, Contractor, Gold Cliff, Monmouth.

TO COLLIERY AND MINE OWNERS. R. HUDSON'S PATENT STEEL CORVES OR "TRAMS."

Entire new principle, saving three-quarters to 2 cwt. "dead" weight per corve. Will hold 2 to 3 cwt. more coal than the ordinary kind, without increasing the outside dimensions. Adopted by—
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KINGWOOD COAL AND IRON CO., near Bristol.
MIDDLETON COLLIERY CO., near Leeds.

Messrs. BARING, GOULD, & ATKINSON, Diamond Fields, South Africa.
Messrs. KIMBERLEY, Diamond Mines, South Africa.
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R. HUDSON, Engineer and Ironfounder, Gildersome Street Foundry, near Leeds (Five minutes walk from Gildersome Station, G.N.R.)

The Barrow Rock Drill COMPANY

Are NOW PREPARED to SUPPLY their DRILLS, the ONLY
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MINES of CORNWALL. At DOLCOATH MINE, in the
HARDEST known ROCK, a SINGLE MACHINE has, since
its introduction in July, 1876, driven MORE THAN THREE
TIMES the SPEED of HAND LABOUR, and at TWENTY PER
CENT. LESS COST PER FATHOM.

In ordinary ends two machines may be worked together,
and at a proportionately increased speed. They are strong,
light, and simple, easily worked, and adapted for ends and
stopes, and the sinking of winzes and shafts.

The company are also prepared to SUPPLY COMPRESSORS,
and all necessary appliances for working the said Drills.

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**LOAM AND SON,
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IMPROVED STEEL WIRE FOR ROPES.

WEBSTER & HORSFALL,

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MANUFACTURERS OF IMPROVED STEEL WIRE FOR ROPES
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SOLE MANUFACTURERS of the HOMOGENEOUS WIRE for the
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THE GREAT ADVERTISING MEDIUM FOR WALES.

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(DAILY), and
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CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

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MINE AND QUARRY STANDS, STEEL DRILLS, SPECIALLY PREPARED INDIARUBBER HOSE, TESTED
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Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and
ELECTRIC BLASTING APPARATUS.

**Full particulars of rapid and economical work effected
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CONTRACTS TAKEN, OR SPECIAL TERMS FOR HIRE.

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THE ROANHEAD ROCK DRILL.

BY ROYAL LETTERS PATENT.

**This justly-celebrated Rock Drill, the only one invented that will
work in the hardest rock without more than the usual repairs re-
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It has been most successfully worked in the well-known Hematite Mines of Lancashire and Cumberland. Will drive 50 to 60 ft.
in hard rock without change of drill, and can be worked by any miner, and kept in repair by any blacksmith. It is the most
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Plans, Estimates, including Compressors, and all other Mining Machinery, supplied on application to the sole makers,—

**SALMON, BARNES, AND CO.,
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Manufacturers of

CRANE, INCLINE, AND PIT CHAINS,

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES
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